

NO. 2172363  
SHEET 0  
OF 62

# DIAGNOSTIC TEST

TITLE DIPAL MONITOR  
MACH. TYPE 1620-I BY JOS APPR. DATE

## ENGINEERING CHANGE HISTORY

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X JOS

- IBM 1620/1710 DIPAL MONITOR -

This manual describes the features of the Disk Pack Library (DIPAL) and the operating procedure for the DIPAL Monitor as it is used with any 1620/1710 system having a 1311 Disk Storage Drive. Included is instruction for storing programs in DIPAL and for loading programs from DIPAL into 1620 core storage. Familiarity with the operation and terms associated with the 1311 Disk Storage Drive is assumed.

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## 1.0 INTRODUCTION

- 1.1 DIPAL Monitor is a 1620/1710 Customer Engineering utility program which enables a CE to generate a Disk Pack Library (DIPAL) for use on 1620/1710 systems having a 1311 Disk Storage Drive. The Monitor also provides two convenient methods for loading programs from DIPAL into 1620 core storage.
- 1.2 What Programs Can Be Stored In DIPAL? While DIPAL is primarily designed for convenient storage of maintenance programs, any program not using core positions 18000 through 19999 can be stored in DIPAL.
- 1.3 Using DIPAL Monitor the CE Can:
  - a. Store programs on the Disk Pack, one program per cylinder.
  - b. Add programs to the library at any time.
  - c. Replace programs previously stored in the library.
  - d. Obtain a list of all programs stored in the library together with their cylinder addresses.
  - e. Run any program in the library by loading the Program Call card for the desired program.
  - f. Run under monitor control any program or sequence of programs, requesting each program by a name assigned when that program was stored in DIPAL.

### 1.4 Equipment Requirements

- a. A 1620/1710 Mod I or II equipped with a 1311 Disk Storage Drive.
- b. A disk pack, usually the CE disk pack, on which the Monitor and the Library can be stored.

### 1.5 Storage Requirements

- a. On the disk pack
  1. The Monitor uses cylinders 4 and 5.
  2. The Library uses one cylinder per program -- starting at cylinder 6.
  3. Cylinders 0-3, 35-37 and 96-99 are not used.
- b. In 1620 core storage

The Monitor is stored in core at 18000 to 19999.

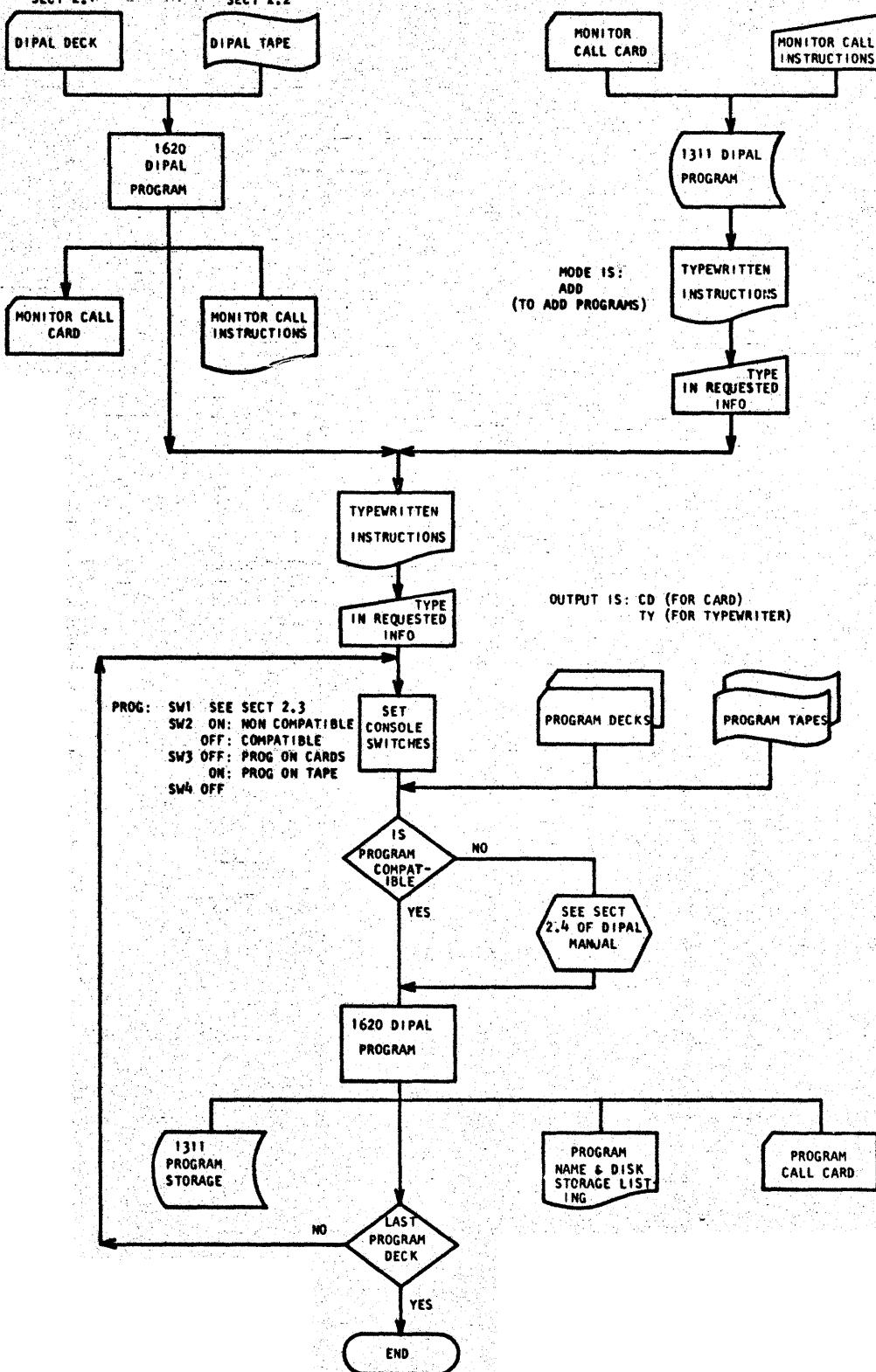
## SYSTEM OPERATION

STORING DIPAL AND PROGRAMS ON THE DISK PACK SECT 2.0

ADDING PROGRAMS TO THE DISK PACK  
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SEE SECT 2.3

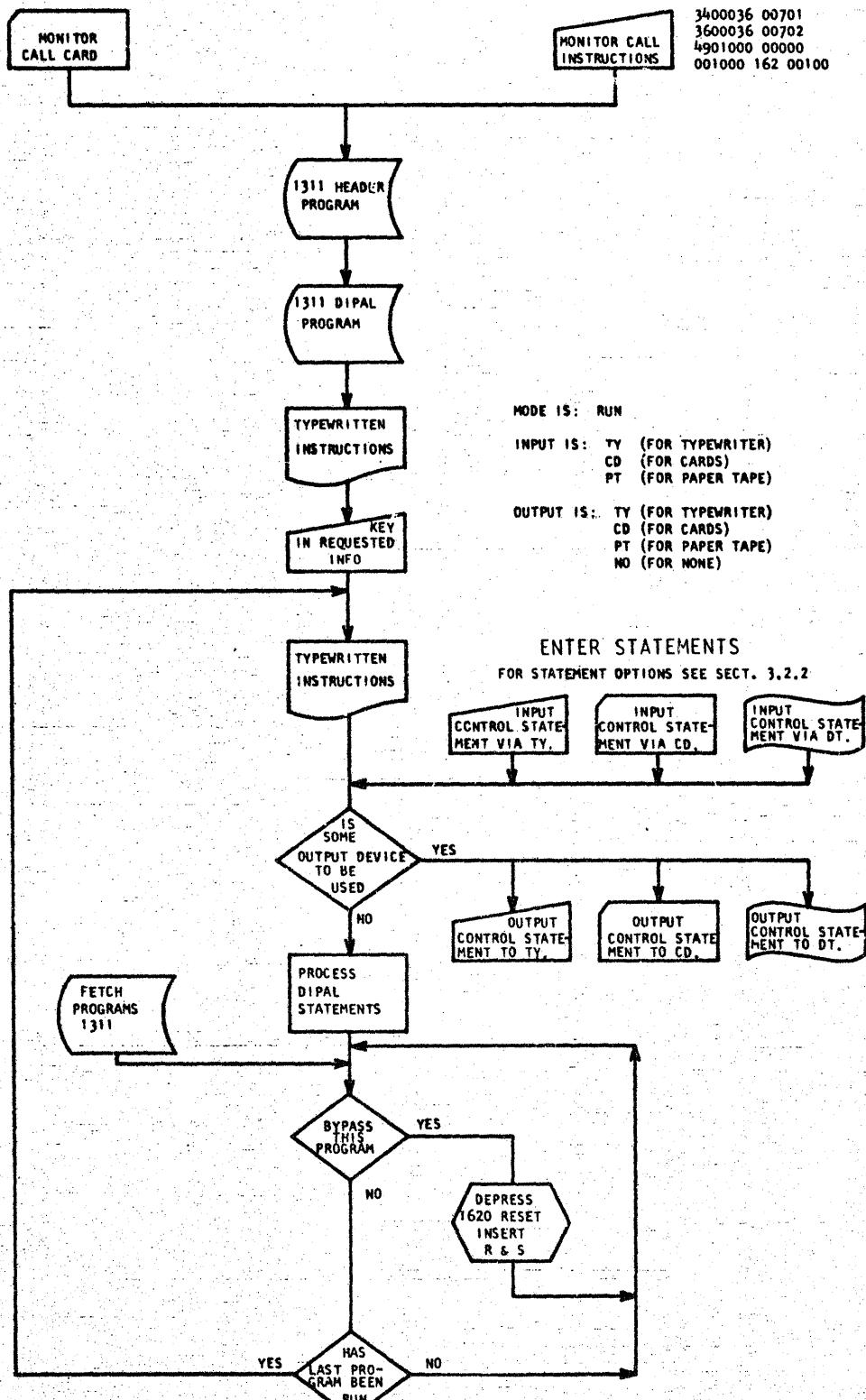
SECT 2.1

SECT 2.2



## SYSTEM OPERATION

RUNNING PROGRAMS UNDER MONITOR CONTROL SEE SECT. 3.2  
FOR MANUAL CONTROL SEE SECT. 3.1



## 2.0 STORING PROGRAMS IN DIPAL

The DIPAL Monitor is available in either card or tape versions. While the procedure will vary slightly depending on which version is used, the user is able to store card or paper tape programs in DIPAL using either version. Programs can be stored in DIPAL either right after the Monitor program is loaded or an ADD mode is provided in the Monitor which enables the user to store programs at any time or to replace programs previously stored.

Any program stored in DIPAL must have assigned to it a four digit DIPAL name. Also, certain "linkage" instructions must be added to the program to provide communication between the program and the monitor. Most 1620/1710 diagnostic programs have been modified to include a name and the required linkages. Programs that have been modified in this way are called DIPAL compatible programs. A list of the available compatible programs together with the names assigned these programs is included in Section 6. To store programs which are not DIPAL compatible, follow the instructions for non-compatible programs.

Any time a program is stored in DIPAL, the DIPAL name assigned to that program and the file address at which it was stored will be typed on the console typewriter. This is the Library List and it should be saved for future reference. This list is further explained in Section 2.5.

### 2.1 Using the Card Version of the DIPAL Monitor

Disk Pack Place a previously addressed Disk Pack (usually the CE Disk Pack) on Disk Drive 0 (If not addressed, use DT 0020 to address the pack).

Load Monitor Place the DIPAL Monitor program in the card hopper and press LOAD.

Check Switches Set to program

MONITOR LOAD WILL BE PUNCHED ON THE 1622 CARD PUNCH

One card will be punched. This card is the MONITOR LOAD card. Label and save this card.

MONITOR WILL LOAD TESTS ON THE 1311  
PLACE DIAGNOSTIC PROGRAMS BEHIND MONITOR IN  
CARD STACKER  
REFER TO PROGRAM DOCUMENTATION TO BE SURE  
PROGRAM IS COMPATIBLE  
SW2 OFF IF PROGRAM IS COMPATIBLE

All 1620-II programs except DT 0100 are compatible. Other compatible programs are identified by a DIPAL name on the title page of the program documentation.

SW3 ON IF PROGRAM IS ON PAPER TAPE

OUTPUT IS Key in CD

A program call card will be punched after each program is loaded. SAVE THIS CARD. For its use, refer to Section 3.1.

Non-Compatible Programs To store non-compatible programs in DIPAL, turn Switch 2 on and go to Section 2.4.

Compatible Card Programs To store compatible card programs both Switch 2 and 3 must be off. Place programs in 1622 read hopper and press 1622 start. All programs will automatically be loaded into core and stored on the file.

Compatible tape programs To store compatible paper tape programs, Switch 3 must be on and Switch 2 off. Loading instructions will be printed on console typewriter.

Note To store card programs after storing tape programs, turn Switch 3 off.

Errors To recover from an operational error, refer to Section 4.

## 2.2 Using the Paper Tape Version of the DIPAL Monitor

Disk Pack Place previously addressed Disk Pack (usually the CE Disk Pack) on Disk Drive 0 (If not addressed, use DT 0020 to address the pack).

Load Monitor Place the DIPAL Monitor program on the paper tape reader. Key in 3600000 00300

Check Switches Set to program

MONITOR LOAD WILL BE PRINTED ON TYPEWRITER

MONITOR WILL LOAD DIAGNOSTIC TESTS ON THE 1311 WHEN MONITOR HALTS WITH A 48 IN THE OP REGISTER PLACE THE DIAGNOSTIC ON THE APPROPRIATE INPUT DEVICE AND LOAD INTO CORE STORAGE FOLLOWING INSTRUCTIONS IN THE PROGRAM DOCUMENTATION.  
SW2 OFF IF PROGRAM IS COMPATIBLE

All 1620-II programs except DT 0100 are compatible. Other compatible programs are identified by a DIPAL name on the title page of the program documentation.

OUTPUT IS	Key in: CD (If no 1622 - key in TY)
	A Program Call Card or series of instructions will be punched/printed after each program is loaded. SAVE THESE CARDS/INSTRUCTIONS. For their use, refer to Section 3.1.
Non-Compatible Programs	To store non-compatible programs in DIPAL, turn Switch 2 on and go to Section 2.4.
Compatible Card or Tape Programs	To store compatible card or tape programs, use standard loading procedures do not clear core.
Errors	To recover from an operational error, refer to Section 4.

**2.3 To Add Programs to the DIPAL Library or Replace Programs Already in the Library.**

---

Disk Pack	Place the DIPAL Disk Pack on Disk Drive 0.
Call Monitor	Use the Monitor Load Card to call the DIPAL Monitor into core storage. If using a tape system, key in:
	340003800701 360003800702 490100000000 001000 16200100
Check Switches	Set to program
Delay	There will be a delay due to the running of the header test.
MODE IS	To select the ADD mode, key in ADD
SW1 ON TO REPLACE PROGRAM	

If SW1 is turned on the Monitor will request a sector address at which the next program will be stored. Using this option, any previously stored programs can be replaced with an updated program having the same DIPAL name or with a new program having a different DIPAL name. With SW1 off, the program will be stored starting at the next available cylinder.

**SW2 OFF IF PROGRAM IS COMPATIBLE  
SW3 ON IF PROGRAM IS ON PAPER TAPE (Card Version only)**

**OUTPUT IS** This message requests the user to specify an output device for Program Call instructions.

Card System key in CD  
Tape System key in TY

**SEC ADD**

If replacing a program (SW1 on) the sector address of that program must be entered.

This address is given on the Library List generated during loading (for explanation of format or instructions for generating a new list, see Section 2.5).

**Note**

To terminate program replacement disregard the last request for SEC ADD, press RESET and turn SW1 off. Additional programs can then be added starting at the next available cylinder in the Library.

**Non-Compatible Programs**

To add non-compatible programs, turn SW2 on and go to Section 2.4.

**Compatible Card Programs**

To add compatible card programs, SW2 and 3 must be off. Use standard card loading procedure - do not clear core.

**Compatible Tape Programs**

To add compatible paper tape programs, SW3 must be on and SW2 off. Use standard paper tape loading procedure - do not clear core.

**Errors**

To recover from an operational error, refer to Section 4.

**2.4 To Store NON-COMPATIBLE Programs**

Follow the DIPAL Store or Add procedure until directed to this section.

**Load Program into Core Storage** Use standard load procedure for that program, card or tape (do not clear core). The program must not exceed core location 17999.

**ADD LINKAGE**

Non-compatible programs lack the program linkage necessary to communicate with the Monitor, therefore, to run under Monitor Control, this linkage must

be provided before the program is stored on the Disk Pack. If the non-compatible program is to be run only under manual control no linkage is required.

To add the linkage, in place of the HALT at the end of the program, insert a branch to some available core location less than 17952. At that location, insert the following instructions:

```
45 YYYYY 18117  
49 18000 00000  
YYYYY 48 00000 00000  
49 START of program
```

Where 18000 and 18117 are addresses in the Monitor program, YYYYY is the address of the HALT in this sequence of instructions and START is the starting address of the non-compatible program.

#### EXAMPLE

Assume the last instructions in the program are as follows:

```
02000 46 01000 00400 LOOP TEST. ∴ SW4  
02012 48 00000 00000 HALT  
02024 49 01000 00000 GO TO START  
02036 12 34567 890 DATA  
33 4445
```

If storage space is available at address 16000 the linkage instructions could be added as follows:

- a. Change the Halt at 02012 to 49 16000 00000
- b. At 16000 enter:

```
16000 45 01000 18117  
16012 49 18000 00000  
16024 48 00000 00000  
16036 49 01000 00000
```

Return to  
Monitor Control

Branch to 18000

FIRST ADDRESS

Key in the START address of the non-compatible program.

#### 4 CHAR NAME FOLLOWED BY RM

Key in an unique four character name for this test. Any alphabetic characters except the Record Mark and Group Mark can be used.

Note

1. Follow the above procedures for each non-compatible test to be loaded.
2. To next load compatible tests, turn SW2 off.

Error To recover from an operational error, refer to Section 4.

#### 2.5 The DIPAL Library Listing

##### 2.5.1 Listing Description

During DIPAL storage, the DIPAL name and disk storage address of each program stored is printed on the console typewriter. When adding programs to the library, a list is also printed of names and addresses of those programs which are added.

In this list, the disk storage address of the program is given as a disk control field. The form is as follows:

NAME      A    BBBBB    CCC    00000

where A is the drive code

BBBBB is the first sector address

CCC is the sector count

If output to the typewriter is requested during DIPAL Load or ADD operations, Program Call instructions will also be typed for each program loaded. These instructions will appear on the Library List immediately following the program name and disk address. This series of instructions can be used to call the program directly from the DIPAL Library independent of Monitor Control.

##### 2.5.2 To Obtain a New List

Call Monitor. Use Monitor Load Card or key in

34 00036 00701  
36 00036 00702  
49 01000 00000  
001000 162 00100

Delay There will be a delay due to the running of a header test.

MODE IS Key in: LIST

### 3.0 RUNNING PROGRAMS STORED IN DIPAL

Programs stored in DIPAL can be called into core under either Manual or Monitor Call Control. Under Manual Control, each program is called into core by its own read file routine. This routine must be read into core through either the console typewriter or the card reader prior to calling each program. Using Monitor Control any series of programs can be requested. Each program called will run the number of times specified by its control statement then the next program in the series will be called into core.

#### 3.1 Manual Control

Any program stored in DIPAL can be called into core storage by a read file from the cylinder on which that program is stored. As each program was stored in DIPAL a read file routine for the program was either punched on a Program Call Card or typed as part of the Library Listing. Any program stored in DIPAL can be called directly into core storage by the Call Card for that program or by typing in the appropriate read file routine.

##### Call Card

To call a program using the Program Call Card, place the Monitor pack on Disk Drive 0 then load the Call Card. The program will be read into core storage, then a branch will be executed to the program START address.

##### Typewriter

To call a program using the console typewriter, key in:

340003600701  
360003600702  
490000000000  
ABBBBBCCCC00000

Where ABBBBBCCC is the DIPAL address of this program as given in the program listing.

A is the Drive Code  
BBBBBB is the Sector Address  
CCC is the Sector Count

##### If not using Disk Drive 0

The Disk Drive Code must correspond to the Disk Drive on which the pack is located.

<u>Drive Code</u>	<u>Disk Drive No.</u>
0	0
3	1
5	2
7	3

### **3.2 Monitor Control**

Any program or group of programs can be run under monitor control. Programs can be run in any order and can be looped, either individually or as a group.

Each program in DIPAL is identified by a four digit name. To run a series of programs under monitor control, the DIPAL name of each program must be entered as a Control Statement. Statements can be keyed in on the console typewriter or frequently used statement sequences can be read in from cards or paper tape. Provision is provided in the program to conveniently punch these cards or tapes.

#### **3.2.1 Monitor Control Set Up Procedure**

##### **Disk Pack**

Place the DIPAL Disk Pack on Disk Drive 0. Manual control must be used to run from any other drive.

##### **Call Monitor**

Use the Monitor Load Card to call the DIPAL Monitor into core storage. This card was punched when the DIPAL Monitor was loaded onto the disk pack.

If using a tape system, key in:

340003600701  
360003600702  
490100000000  
00100016200100

##### **Header Test**

Before the monitor program is read into core, a test is made of all functions required by the monitor. This runs approximately:

1620 I - 30 sec.

1620 II - 8 sec.

If a failure is detected by this test, refer to Section 5 for suggested service procedures.

##### **MODE IS**

To select the run mode, key in RUN

##### **INPUT IS**

This message requests the user to specify the input device from which the control statements will be entered.

<u>Options</u>	<u>Key in</u>
Typewriter	TY
Card Reader	CD
Paper Tape	PT (after loading tape)

#### OUTPUT IS

This message requests the user to specify one of four options:

<u>Options</u>	<u>Key in</u>
a. Punch Control Statement Cards	CD
b. Punch Control Statement Tape	PT
c. List Control Statements	TY
d. No Output	NO

With this option the user can simplify future set up by punching control statements on card or tape.

#### ENTER STATEMENTS

The user is requested to specify the programs to be run by entering the appropriate control statements.

The basic control statement is the DIPAL name. This is the four digit name used to identify the program in the Library Listing. For other Control Statements and statement options refer to Control Statement Options, Section 3.2.2.

#### Typewriter Entry

To enter control statements from the typewriter (TY keyed in following INPUT IS):

- a. Key in statement (no spaces allowed)
- b. Press R-S after each statement.
- c. After last statement, key in GO

#### Card Entry

To enter control statements from cards (CD keyed in following INPUT IS):

- a. Place cards in 1622 read hopper
- b. Press 1622 START

### Tape Entry

To enter control statements from paper tape (PT keyed in following INPUT IS):

If tape was not previously loaded, the 1620 will hang with a Reader-No-Feed. To recover, mount the tape, then branch to 10,000.

### To Bypass a Program

Any program can be bypassed after it is called into core by branching to 18000.

### To Call More Programs

When all programs requested have been executed, the message ENTER STATEMENTS is typed. A new sequence of statements can then be entered.

### To Correct Errors

If a typing error is made:

- a. Turn Switch 4 on
- b. Press R-S
- c. Enter corrected statement
- d. Turn Switch 4 off
- e. Press R-S

If an error message is typed:

- a. Check Section 4 for explanation of error.
- b. Press START
- c. Enter corrected statement
- d. Press R-S

### 3.2.2 Control Statement Options

While the basic control statement is the DIPAL name, additional statements are available to increase the versatility of Monitor Control.

Option	Control Statement
Loop a Program	Follow the DIPAL name with a comma and any number between 1 and 99999. The requested program will be executed the number of times specified before the next program is called into core.
	Example: DT11, 25 DT17 GO

<u>Option</u>	<u>Control Statement</u>
Note:	DT 0018 can not be looped.
Loop a series of programs	<p>Follow the last test name in the series with the statement LOOP, n, where n is any number between 1 and 99999.</p> <p>Example: 0101 0102 0103 LOOP, 10 0104</p> <p>The test series DT0101, 0102, and 0103 will loop 10 times before DT0104 is executed.</p>
Note:	Loop statements must be separated by a GO statement.
To halt after any program	<p>Enter the statement HALT. The computer will halt with the last executed program still in core.</p> <p>Example: DT 11 DT 17, 5 HALT DT 18 GO</p> <p>After running DT0011 five times, the computer will halt with DT0017 still in core. Press START to call and run DT0018.</p>
To run all programs	<p>Enter the statement ALL. All programs in DIPAL will be executed once in the order they were stored in the library. ALL must be the first instruction in the control sequence. GO is not required following ALL.</p>

### 3.2.3 Control Statement Input From Card or Tape

Set up of frequently run test sequences can be simplified by placing the control statements for those test sequences on cards or paper tape. Control statement cards or tapes can easily be prepared any time a sequence of statements is entered during the RUN set up procedure.

#### 3.2.3.1 To generate Control Statement Cards or Tapes

Following the message OUTPUT IS: key in CD or PT

3.2.3.2 To enter statements from Cards or Tapes

Following the message INPUT IS: key in  
CD or PT

Note: If entering from tape, mount tape before continuing. If the tape is not mounted before the message ENTER STATEMENTS is typed, the 1620 will hang up with a reader-no-feed. To recover, mount tape then branch to 10,000.

3.2.3.3 To get a typewriter listing of statements entered via card or paper tape

Following the message OUTPUT IS: key in TY

3.2.3.4 Stacking Control Sequences

When entering statements from card or paper tape the statements will read in until either a GO command is encountered or the monitor execution area is full. After all tests have run the message ENTER STATEMENTS is typed and the program will immediately attempt to read additional statements from the designated input device. This feature allows you to stack statement sequences, each sequence separated by a GO command, or to stack an unlimited number of statements without exceeding the capacity of the Monitor program.

## 4. C RECOVERY FROM OPERATIONAL ERRORS

### 4.1 Typing Errors

If a typing error is made when entering any requested information in either the STORE or RUN modes:

- a. Turn switch 4 on
- b. Press R-S
- c. Key in correct data
- d. Turn switch 4 off
- e. Press R-S

### 4.2 Loading Errors

If an error, a parity check for example, should occur while loading a program into core:

- a. If this error is detected before the program is stored on the file, just reload the program.
- b. If the program has been placed on the file (in this case the name and address of the program will have been typed on the program list) continue loading programs. Replace the bad program later using the Add operation.

### 4.3 Error Messages

Each reading or writing operation performed by the Monitor is verified. If an error is detected, an error message will be printed out on the typewriter. Also, each DIPAL statement and control function entered during set up of STORE or RUN operations is examined for proper format and correct order of input.

If a file operation results in a file check, the monitor program will automatically re-execute that operation. No operator action is required to correct this error. If, however, the error is due to improper entry of a control statement or other illegal operator action, the computer will HALT. To continue, press START and re-enter the statement in which the error occurred.

#### Error Messages/Reason

ER002	Read-back check for either a read or write disk operation.
ER003	Format error; a Dipal Statement is formatted improperly or out of sequence.
ER004	More than one LOOP statement has been entered. (LOOP statements must be separated by a GO command.)
ER005	Not Used.

Error Messages/Reason (continued)

ER006 NAME statement contains more than four alphanumeric characters.

ER007 An illegal statement has been entered. This is probably the result of mis-spelling or referring to a program name improperly.

ER008 No more cylinders are available on the Customer Engineer's disk pack to accept new programs.

ER010 LOOP statement contains more than ten characters.

ER011 A read-back check error occurred when Monitor Control subroutine attempted to write itself on the 1311 during the initial loading operation.

ER012 A read-back check error occurred when the Load add subroutine attempted to write itself on the 1311 during an initial loading operation.

ER013 A read-back check error occurred when the Run subroutine attempted to write itself on the 1311 during the initial loading operation.

ER014 A read-back check error occurred when the subroutines required by the DIPAL statements GO, LOOP, or NAME, were written on the 1311 during the initial loading operation.

ER015 A read-back check error occurred when the updated areas of Monitor Control subroutine were written on the 1311 during the initial loading operation. The updated areas contain the disk control fields of the RUN and Monitor Control subroutines.

ER016 (1) A read-back check occurred when the math tables were written on the 1311 during the initial loading operation.  
(2) If replacing programs, then the operator is attempting to replace programs that are not loaded.

ER017 A read-back check occurred when the math tables were read from the 1311 after a Monitor call.

Error Messages/Reason (continued)

- ER018 A read-back check error occurred when reading from the 1311 those subroutines required by a DIPAL statement.
- ER019 No comma in the LOOP statement.
- ER020 The last core position of a program written into core storage exceeded location 18000. (This condition has clobbered the Monitor program; use ADD mode Section 2.3 to restart.)
- ER022 An ALL statement is improperly use; the ALL statement was entered following a statement other than GO.
- ER023 Name statement with loop control contains more than 10 characters.
- ER024 Illegal character in number field of LOOP statement.
- ER025 Illegal character in number field of NAME statement.
- ER026 An address check occurring when the header test is reading Monitor Control subroutine from the 1311.
- ER027 An address check occurred when the Header Test attempts to write itself on the 1311 during the initial loading operation.
- ER110 A read-back check occurred when the updated portions of Monitor Control were written on the 1311 during initial load time.

## **5.0 HEADER TEST**

When the DIPAL Monitor is called it is preceeded into core by a fault detection test. This test, called the Header Test, checks the operation of those 1620 functions which are required by the DIPAL Monitor. This test will loop 100 times before transferring control to the monitor program. Since this test is not intended to be a trouble shooting tool, no switch control options are available.

### **5.1 Header Test Error Procedure**

If a failure is detected by the header test, the program will either hang up or type an error message. Since this test is not designed to be a diagnostic tool, the CPU diagnostic should be called from DIPAL before attempting to continue. To call this directly from the disk file, use the Program Call Card or type in a read file routine as described in Section 3.1.

### **5.2 To Trouble Shoot Using The Header Test**

The header test consists of a series of short routines. In each routine, a single function is performed and checked. If an error is detected, the program will type a message and HALT at the end of the routine in which the error was detected. The MAR register will contain the Q11 address of this HALT instruction. Using this address, the specific routine detecting the error can be located in the header test listing (the HALT is the last instruction in each routine).

The first instruction in a test routine is identified by an SPS label of the form RXX or RXXX. This instruction is followed by a comment describing the test performed by that routine.

Example:      R4B BD \*+60, DT+4,,

                RCTY

                WATY ER04

                WATY D80

                H

### 5.3 HEADER LISTING

00470\* ROUTINE 02  
 00480\* THIS ROUTINE TESTS BI(46) AND BNI(47) ON SW 4  
 00490 RT02 BC4 \*+72,,, BI (46) ON SWITCH 4 01178 46 01250 00400  
 00500 BNC4 RT04,,, BNI (47) ON SWITCH 4 01190 47 01354 00400  
 00510 RCTY  
 00520 WATY R2ER1,,,  
 00530 H \*\*\*  
 00540 B RT04,,,  
 00550 BNC4 \*+24,,, BNI (47) ON SWITCH 4 01238 49 01354 00000  
 00560 B RT04,,, 01250 47 01274 00400  
 00570 RCTY 01262 49 01354 00000  
 00580 WATY R2ER1,,, 01274 34 00000 00102  
 00590 H \*\*\*  
 00600 B RT04,,, 01286 39 01323 00100  
 00610\* CONSTANTS USED IN ROUTINE 2  
 00620 R2ER1 DAC 16+B ON SW4 FAILED! 01323 00032  
 00630\* ROUTINE 04  
 00640\* THIS ROUTINE TESTS BRANCH ON DIGIT (43)  
 00650 RT04 BD \*+60,DT,, BRANCH ON DIGIT ON A 1 ODD 01354 43 01414 02135  
 00660 RCTY \*\*\* 01366 34 00000 00102  
 00670 WATY ERO4,,, 01378 39 02155 00100  
 00680 WATY D10,,, 01390 39 02267 00100  
 00690 H \*\*\* 01402 48 00000 00000  
 00700\*  
 00710 R4A BD \*+60,DT+2,, BRANCH ON DIGIT ON A 2 ODD 01414 43 01474 02137  
 00720 RCTY \*\*\* 01426 34 00000 00102  
 00730 WATY ERO4,,, 01438 39 02155 00100  
 00740 WATY D20,,, 01450 39 02279 00100  
 00750 H \*\*\* 01462 48 00000 00000  
 00760\*  
 00770 R4B BD \*+60,DT+4,, BRANCH ON DIGIT ON A 4 ODD 01474 43 01534 02139  
 00780 RCTY \*\*\* 01486 34 00000 00102  
 00790 WATY ERO4,,, 01498 39 02155 00100  
 00800 WATY D40,,, 01510 39 02291 00100  
 00810 H \*\*\* 01522 48 00000 00000  
 00820\*  
 00830 R4C BD \*+60,DT+6,, BRANCH ON DIGIT ON AN 8 ODD 01534 43 01594 02141  
 00840 RCTY \*\*\* 01546 34 00000 00102  
 00850 WATY ERO4,, 01558 39 02155 00100  
 00860 WATY D80,,, 01570 39 02303 00100  
 00870 H \*\*\* 01582 48 00000 00000  
 00880\*  
 00890 R4D BD \*+60,DT+7,, BRANCH ON DIGIT ON A 1 EVEN 01594 43 01654 02142  
 00900 RCTY \*\*\* 01606 34 00000 00102  
 00910 WATY ERO4,,, 01618 39 02155 00100  
 00920 WATY D1E,,, 01630 39 02315 00100  
 00930 H \*\*\* 01642 48 00000 00000  
 00940\*  
 00950 R4E BD \*+60,DT+9,, BRANCH ON DIGIT ON A 2 EVEN 01654 43 01714 02144  
 00960 RCTY \*\*\* 01666 34 00000 00102

00970		WATY	ERO4,,,	01678	39	02155	00100	
00980		WATY	D2E,,,	01690	39	02329	00100	
00990		H	,,,	01702	48	00000	00000	
01000*								
01010	R4F	BD	#+60,DT+11,,	BRANCH ON DIGIT ON A 4 EVEN	01714	43	01774	02146
01020		RCTY	,,,		01726	34	00000	00102
01030		WATY	ERO4,,,		01738	39	02155	00100
01040		WATY	D4E,,,		01750	39	02343	00100
01050		H	,,,		01762	48	00000	00000
01060*								
01070	R4G	BD	#+60,DT+13,,	BRANCH ON DIGIT ON AN 8 EVEN	01774	43	01834	02148
01080		RCTY	,,,		01786	34	00000	00102
01090		WATY	ERO4,,,		01798	39	02155	00100
01100		WATY	D8E,,,		01810	39	02357	00100
01110		H	,,,		01822	48	00000	00000
01120*								
01130	R4H	BD	#+24,DT+15,,	BRANCH DIGIT ON A 0 EVEN WITH A 7 IN ODD	01834	43	01858	02150
01140	B	R4I,,,			01846	49	01906	00000
01150		RCTY	,,,		01858	34	00000	00102
01160		WATY	ERO5,,,		01870	39	02215	00100
01170		WATY	D07O		01882	39	02371	00100
01180		H	,,,		01894	48	00000	00000
01190*								
01200	R4I	BD	#+24,DT+5,,	BRANCH DIGIT ON A 0 EVEN WITH AN 8 IN ODD	01906	43	01930	02140
01210	B	R4J,,,			01918	49	01978	00000
01220		RCTY	,,,		01930	34	00000	00102
01230		WATY	ERO5,,,		01942	39	02215	00100
01240		WATY	D08O,,,		01954	39	02407	00100
01250		H	,,,		01966	48	00000	00000
01260*								
01270	R4J	BD	#+24,DT+18,,	BRANCH ON DIGIT ON A 0 ODD WITH A 7 IN EVEN	01978	43	02002	02153
01280	B	R4K,,,			01990	49	02050	00000
01290		RCTY	,,,		02002	34	00000	00102
01300		WATY	ERO5,,,		02014	39	02215	00100
01310		WATY	D07E,,,		02026	39	02445	00100
01320		H	,,,		02038	48	00000	00000
01330*								
01340	R4K	BD	#+24,DT+14,,	BRANCH ON DIGIT ON A 0 ODD WITH AN 8 IN EVEN	02050	43	02074	02149
01350	B	RT05,,,			02062	49	02518	00000
01360		RCTY	,,,		02074	34	00000	00102
01370		WATY	ERO5,,,		02086	39	02215	00100
01380		WATY	D08E,,,		02098	39	02481	00100
01390		H	,,,		02110	48	00000	00000
01400	B	RT05,,,			02122	49	02518	00000
01410*				CONSTANTS USED IN ROUTINE 04				
01420	DT	DC	2,01		02135	00002		
01430		DC	18,020408102040800770		02153	00018		

01440	ERO4	DAC	30, BD (43) DID NOT BRANCH ON A !	02155 00060
01450	ERO5	DAC	26, BD (43) BRANCHED ON A 0 !	02215 00052
01460	D10	DAC	6,1 ODD!	02267 00012
01470	D20	DAC	6,2 ODD!	02279 00012
01480	D40	DAC	6,4 ODD!	02291 00012
01490	D80	DAC	6,8 ODD!	02303 00012
01500	D1E	DAC	7,1 EVEN!	02315 00014
01510	D2E	DAC	7,2 EVEN!	02329 00014
01520	D4E	DAC	7,4 EVEN!	02343 00014
01530	D8E	DAC	7,8 EVEN!	02357 00014
01540	D070	DAC	18,EVEN WITH A 7 ODD!	02371 00036
01550	D080	DAC	19,EVEN WITH AN 8 ODD!	02407 00038
01560	D07E	DAC	18,ODD WITH A 7 EVEN!	02445 00036
01570	D08E	DAC	19,ODD WITH AN 8 EVEN!	02481 00038
01580*			ROUTINE 05	
01590*			THIS ROUTINE TESTS BRANCH NO FLAG (44)	
01600	RT03	BNF	*+60,FT-1,, BRANCH NO FLAG ON 0 EVEN WITH NO FLAG	
01610		RCTY	***	02518 44 02578 02796
01620		WATY	ERO6***	02530 34 00000 00102
01630		WATY	EVEN***	02542 39 02799 00100
01640		H	***	02554 39 02921 00100
01650*				02566 48 00000 00000
01660	RSA	BNF	*+60,FT-2,, BRANCH NO FLAG ON 0 ODD WITH NO FLAG	
01670		RCTY	***	02578 44 02638 02795
01680		WATY	ERO6***	02590 34 00000 00102
01690		WATY	ODD***	02602 39 02799 00100
01700		H	***	02614 39 02931 00100
01710*				02626 48 00000 00000
01720	R5B	BNF	*+24,FT-3,, BRANCH NO FLAG ON FLAG 0 EVEN	
01730		B	R5C***	02638 44 02662 02794
01740		RCTY	***	02650 49 02710 00000
01750		WATY	ERO7***	02662 34 00000 00102
01760		WATY	EVEN***	02674 39 02861 00100
01770		H	***	02686 39 02921 00100
01780*				02698 48 00000 00000
01790	R5C	BNF	*+24,FT,, BRANCH NO FLAG ON FLAG 0 ODD	
01800		B	RT06***	02710 44 02734 02797
01810		RCTY	***	02722 49 02938 00000
01820		WATY	ERO7***	02734 34 00000 00102
01830		WATY	ODD***	02746 39 02861 00100
01840		H	***	02758 39 02931 00100
01850		B	RT06***	02770 48 00000 00000
01860*			CONSTANTS USED IN ROUTINE 05	02782 49 02938 00000
01870	FT	DC	4,-0000	02797 00004
01880	ERO6	DAC	31, BNF (44) DID NOT BRANCH ON 0 !	02799 00062
01890	ERO7	DAC	30, BNF (44) BRANCHED ON FLAG 0 !	02861 00060
01900	EVEN	DAC	5,EVEN!	02921 00010
01910	ODD	DAC	4,ODD!	02931 00008
01920*			ROUTINE 06	

01930\* THIS ROUTINE TESTS BRANCH NO RECORD MARK (45)

01940 RT06 BNR \*+60,RM-5,, BRANCH NO RECORD MARK ON A 9 EVEN

01950	RCTY ,,,	02938 45 02998 03334
01960	WATY ERO8,,,	02950 34 00000 00102
01970	WATY D9E,,,	02962 39 03341 00100
01980	H ,,,	02974 39 03459 00100
01990*		02986 48 00000 00000

02000 R6A BNR \*+60,RM-4,, BRANCH NO RECORD MARK ON A 9 ODD

02010	RCTY ,,,	02998 45 03058 03335
02020	WATY ERO8,,,	03010 34 00000 00102
02030	WATY D90,,,	03022 39 03341 00100
02040	H ,,,	03034 39 03473 00100
02050*		03046 48 00000 00000

02060 R6B BNR \*+60,RM-3,, BRANCH NO RECORD MARK ON A 3 EVEN

02070	RCTY ,,,	03058 45 03118 03336
02080	WATY ERO8,,,	03070 34 00000 00102
02090	WATY D3E,,,	03082 39 03341 00100
02100	H ,,,	03094 39 03485 00100
02110*		03106 48 00000 00000

02120 R6C BNR \*+60,RM,, BRANCH NO RECORD MARK ON A 3 ODD

02130	RCTY ,,,	03118 45 03178 03339
02140	WATY ERO8,,,	03130 34 00000 00102
02150	WATY D30,,,	03142 39 03341 00100
02160	H ,,,	03154 39 03499 00100
02170*		03166 48 00000 00000

02180 R6D BNR \*+24,RM-1,, BRANCH NO RECORD MARK ON RECORD MARK EVEN

02190	B R6E,,,	03178 45 03202 03338
02200	RCTY ,,,	03190 49 03250 00000
02210	WATY ERO9,,,	03202 34 00000 00102
02220	WATY EVEN,,,	03214 39 03403 00100
02230	H ,,,	03226 39 02921 00100
02240*		03238 48 00000 00000

02250 R6E BNR \*+24,RM-2,, BRANCH NO RECORD MARK ON RECORD MARK ODD

02260	B RT07,,,	03250 45 03274 03337
02270	RCTY ,,,	03262 49 03510 00000
02280	WATY ERO9,,,	03274 34 00000 00102
02290	WATY ODD,,,	03286 39 03403 00100
02300	H ,,,	03298 39 02931 00100
02310	B RT07	03310 48 00000 00000
02320*	CONSTANTS USED IN ROUTINE 06	03322 49 03510 00000

02330 DSC 4,993\* 03334 00004

02340 DC 1,1 03338 00001

02350 RM DSC 1,3 03339 00001

02360 ERO8 DAC 31, BNR (45) DID NOT BRANCH ON A 1 03341 00062

02370 ERO9 DAC 28, BNR (45) BRANCHED ON A RM 1 03403 00056

02380 D9E DAC 7,9 EVEN! 03459 00014

02390 D90 DAC 6,9 ODD! 03473 00012

02400	D3E	DAC	7,3 EVEN*	03485	00014
02410	D30	DAC	6,3 ODD*	03499	00012
02420*			ROUTINE 07		
02430*			THIS ROUTINE TESTS TRANSMIT DIGIT IMMEDIATE (15)		
02440	RT07	TDM	#+34,701,9, TRANSMIT DIGIT IMMEDIATE 1 TO EVEN	03510	15 03544 00P01
02450		BD	#+36,*+20,, CHECK TRANSMIT DIGIT LIKE TRANSMIT FIELD	03522	43 03558 03542
02460		BD	E7A,601,, CHECK THAT 1 WAS TRANSMITTED PROPERLY	03534	43 03594 00601
02470		B	R7A,,,	03546	49 03642 00000
02480		RCTY	***	03558	34 00000 00102
02490		WATY	ER35,,,	03570	39 03991 00100
02500		H	***	03582	48 00000 00000
02510	E7A	RCTY	***	03594	34 00000 00102
02520		WATY	ONE,,,	03606	39 04125 00100
02530		WATY	ER36	03618	39 04049 00100
02540		H	***	03630	48 00000 00000
02550*					
02560	R7A	TDM	#+23,2,10, TRANSMIT DIGIT 2 TO ODD	03642	15 03665 000-2
02570		BD	#+24,620,,	03654	43 03678 00620
02580		B	R7B,,,	03666	49 03726 00000
02590		RCTY	***	03678	34 00000 00102
02600		WATY	TWO,,,	03690	39 04135 00100
02610		WATY	ER36,,,	03702	39 04049 00100
02620		H	***	03714	48 00000 00000
02630*					
02640	R7B	TDM	#+23,4,10, TRANSMIT DIGIT 4 TO ODD	03726	15 03749 000-4
02650		BD	#+24,640,,	03738	43 03762 00640
02660		B	R7C,,,	03750	49 03810 00000
02670		RCTY	***	03762	34 00000 00102
02680		WATY	FOR,,,	03774	39 04145 00100
02690		WATY	ER36,,,	03786	39 04049 00100
02700		H	***	03798	48 00000 00000
02710*					
02720	R7C	TDM	#+23,8,10, TRANSMIT DIGIT 8 TO ODD	03810	15 03833 000-8
02730		BD	#+24,680,,	03822	43 03846 00680
02740		B	R7D,,,	03834	49 03894 00000
02750		RCTY	***	03846	34 00000 00102
02760		WATY	ATE,,,	03858	39 04155 00100
02770		WATY	ER36,,,	03870	39 04049 00100
02780		H	***	03882	48 00000 00000
02790*					
02800	R7D	TDM	#+22,0,10, TRANSMIT DIGIT 0 TO EVEN	03894	15 03916 000-0
02810		BD	#+24,670,,	03906	43 03930 00670
02820		B	END7,,,	03918	49 04176 00000
02830		RCTY	***	03930	34 00000 00102
02840		WATY	ZRO,,,	03942	39 04167 00100
02850		WATY	ER36,,,	03954	39 04049 00100
02860		H	***	03966	48 00000 00000
02870		B	END7,,,	03978	49 04176 00000
02880*			CONSTANTS USED IN ROUTINE 07		
02890	ER35	DAC	29, TDM (15) ACTS LIKE TFM (16)	03991	00058

02900	ER36	DAC	38, NOT TRANSMITTED PROPERLY BY TDM (15)*	04049	00076
02910	ONE	DAC	5, A 1*	04125	00010
02920	TWO	DAC	5, A 2*	04135	00010
02930	FOR	DAC	5, A 4*	04145	00010
02940	ATE	DAC	6, AN 8*	04155	00012
02950	ZRO	DAC	5, A 0*	04167	00010
02960*					
02970	END7	TDM	RT07+32,0,10	04176	15 03542 000-0
02980		TDM	RT07+33,6,10	04188	15 03543 000-6
02990		TDM	RT07+34,0,10	04200	15 03544 000-0
03000		TDM	RT07+35,1,10	04212	15 03545 000-1
03010		TDM	R7A+23,0,10	04224	15 03665 000-0
03020		TDM	R7B+23,0,10	04236	15 03749 000-0
03030		TDM	R7C+23,0,10,	04248	15 03833 000-0
03040		TDM	R7D+22,7,10,	04260	15 03916 000-7
03050*			ROUTINE 08		
03060*			THIS ROUTINE CHECKS TRANSMIT DIGIT (25)		
03070	RT08	TDM	*+47,7,, INITIALIZE	04272	15 04319 00007
03080		TDM	*+59,0,, INITIALIZE	04284	15 04343 00000
03090		TD	*+23,N0,, TRANSMIT 0	04296	25 04319 04550
03100		BD	*+48,607,,	04308	43 04356 00607
03110		TD	*+23,N8,, TRANSMIT 8	04320	25 04343 04552
03120		BD	E8A,680,,	04332	43 04416 00680
03130		B	RT09,,,	04344	49 04554 00000
03140		RCTY		04356	34 00000 00102
03150		WATY	ZRO,,,	04368	39 04167 00100
03160		WATY	ER37,,,	04380	39 04477 00100
03170		B	RT09,,,	04392	49 04554 00000
03180		H	,,,	04404	48 00000 00000
03190	E8A	RCTY	,,,	04416	34 00000 00102
03200		WATY	ATE,,,	04428	39 04155 00100
03210		WATY	ER37,,,	04440	39 04477 00100
03220		H	,,,	04452	48 00000 00000
03230		B	RT09,,,	04464	49 04554 00000
03240*			CONSTANTS USED IN ROUTINE 08		
03250	ER37	DAC	37, NOT TRANSMITTED PROPERLY BY TD (25)*	04477	00074
03260	NO	DSC	02,0*	04550	00002
03270	N8	DSC	02,8*	04552	00002
03280*			ROUTINE 09		
03290*			THIS ROUTINE TESTS SET FLAG (32)		
03300	RT09	TDM	WA9+2,, SET 2 IN EVEN WORK AREA	04554	15 05526 00002
03310		SF	WA9,,, TEST INSTRUCTION	04566	32 05526 00000
03320		BNF	*+24,WA9,,	04578	44 04602 05526
03330		B	R9A,,,	04590	49 04650 00000
03340		RCTY	,,,	04602	34 00000 00102
03350		WATY	ER38,,,	04614	39 05529 00100
03360		WATY	D2E,,,	04626	39 02329 00100
03370		H	,,,	04638	48 00000 00000
03380*					
03390	R9A	TDM	WA9+1,3,, SET 3 IN ODD WORK AREA	04650	15 05527 00003
03400		SF	WA9+1,,, TEST SF	04662	32 05527 00000
03410		BNF	*+24,WA9+1,,	04674	44 04698 05527
03420		B	R9B,,,	04686	49 04746 00000

03430	RCTY	***		04698	34	00000	00102
03440	WATY	ER38***		04710	39	05529	00100
03450	WATY	D30***		04722	39	03499	00100
03460	H	***		04734	48	00000	00000
03470*							
03480 R9B	TDM	WA9+2,11,	SET FLAG 2 IN EVEN WORK AREA	04746	15	05526	0000K
03490	SF	WA9***	TEST SF	04758	32	05526	00000
03500	BNF	*+24,WA9**		04770	44	04794	05526
03510	B	R9C***		04782	49	04842	00000
03520	RCTY	***		04794	34	00000	00102
03530	WATY	ER38SF***		04806	39	05601	00100
03540	WATY	F2E***		04818	39	05677	00100
03550.	H	***		04830	48	00000	00000
03560*							
03570 R9C	TDM	WA9+1,3,11,	SET FLAG 3 IN ODD WORK AREA	04842	15	05527	0000L
03580	SF	WA9+1***	TEST SF	04854	32	05527	00000
03590	BNF	*+24,WA9+1**		04866	44	04890	05527
03600	B	R9D***		04878	49	04938	00000
03610	RCTY	***		04890	34	00000	00102
03620	WATY	ER38SF***		04902	39	05601	00100
03630	WATY	F30***		04914	39	05701	00100
03640	H	***		04926	48	00000	00000
03650*							
03660 R9D	TDM	WA9***	SET RECORD MARK IN EVEN WORK AREA	04938	15	05526	00000
03670	DC	1,*,*	DEFINE RECORD MARK IN Q11 ON PREVIOUS INST.	04949	00001		
03680	SF	WA9***	TEST SF	04950	32	05526	00000
03690	BNF	*+24,WA9**		04962	44	04986	05526
03700	B	R9E***		04974	49	05034	00000
03710	RCTY	***		04986	34	00000	00102
03720	WATY	ER38***		04998	39	05529	00100
03730	WATY	RME***		05010	39	05723	00100
03740	H	***		05022	48	00000	00000
03750*							
03760 R9E	TD	WA9+1,WA9**	SET FLAG RECORD MARK IN ODD WORK AREA	05034	25	05527	05526
03770	SF	WA9+1***	TEST SF	05046	32	05527	00000
03780	BNF	*+24,WA9+1**		05058	44	05082	05527
03790	B	R9F***		05070	49	05130	00000
03800	RCTY	***		05082	34	00000	00102
03810	WATY	ER38SF***		05094	39	05601	00100
03820	WATY	FRMO***		05106	39	05757	00100
03830	H	***		05118	48	00000	00000
03840*							
03850 R9F	TDM	WA9+1,2**	SET 2 IN ODD WORK AREA	05130	15	05527	00002
03860	SF	WA9+1***	TEST SF	05142	32	05527	00000
03870	BNF	*+24,WA9+1**		05154	44	05178	05527
03880	B	R9G***		05166	49	05226	00000
03890	RCTY	***		05178	34	00000	00102
03900	WATY	ER38***		05190	39	05529	00100

03910	WATY D20,,,		05202 39 02279 00100
03920	H    ,,,		05214 48 00000 00000
03930*			
03940 R9G	TDM WA9+3,,,	SET 3 IN EVEN WORK AREA	05226 15 05526 00003
03950	SF WA9,,,	TEST SF	05238 32 05526 00000
03960	BNF #+24,WA9,,,		05250 44 03274 05526
03970	B    R9H,,,		05262 49 05322 00000
03980	RCTY   ,,,		05274 34 00000 00102
03990	WATY ER38,,,		05286 39 05529 00100
04000	WATY D3E,,,		05298 39 03485 00100
04010	H    ,,,		05310 48 00000 00000
04020*			
04030 R9H	TDM WA9+1,2,11,	SET FLAG 2 IN ODD WORK AREA	
04040	SF WA9+1,,	TEST SF	05322 15 05527 00000
04050	BNF #+24,WA9+1,,		05334 32 -N5KP 00000
04060	B    R91,,,		05346 44 05370 05527
04070	RCTY   ,,,		05358 49 05418 00000
04080	WATY ER38SF,,,		05370 34 00000 00102
04090	WATY F20,,,		05382 39 05601 00100
04100	H    ,,,		05394 39 05799 00100
04110*			05406 48 00000 00000
04120 R9I	TDM WA9,3,11,	SET FLAG 3 IN EVEN WORK AREA	
04130	SF WA9,,,	TEST SF	05418 15 05526 00000
04140	BNF #+24,WA9,,,		05430 32 05526 00000
04150	B    RT010,,,		05442 44 05466 05526
04160	RCTY   ,,,		05454 49 05844 00000
04170	WATY ER38SF,,,		05466 34 00000 00102
04180	WATY F3E,,,		05478 39 05601 00100
04190	H    ,,,		05490 39 05821 00100
04200	B    RT010,,,		05502 48 00000 00000
04210*	CONSTANTS USED IN ROUTINE 09		05514 49 05844 00000
04220 WA9	DSC 2,00		05524 00002
04230 ER38	DAC 36, SET FLAG (32) DID NOT SET FLAG ON		05529 00072
04240 ER38SF	DAC 38,SF (32) DID NOT FUNCTION PROPERLY ON		05601 00076
04250 F2E	DAC 12,FLAG 2 EVEN		05677 00024
04260 F30	DAC 11,FLAG 3 ODD		05701 00022
04270 RME	DAC 17,RECORD MARK EVEN		05723 00034
04280 FRMO	DAC 21,FLAG RECORD MARK ODD		05757 00042
04290 F20	DAC 11,FLAG 2 ODD		05799 00022
04300 F3E	DAC 12,FLAG 3 EVEN		05821 00024
04310*	ROUTINE 10		
04320*	THIS ROUTINE TESTS CLEAR FLAG (33)		
04330 RT010	TDM WA9+2,,	SET 2 IN WORK AREA EVEN	05844 15 05526 00002
04340	CF WA9,,,	TEST CF	05856 33 05526 00000
04350	BNF #+60,WA9,,,		05868 44 05928 05526
04360	RCTY   ,,,		05880 34 00000 00102
04370	WATY ER39CF,,,		05892 39 06793 00100
04380	WATY D2E,,,		05904 39 02329 00100
04390	H    ,,,		05916 48 00000 00000
04400*			
04410 R10A	TDM WA9+1,2,,	SET 2 IN WORK AREA ODD	05928 15 05527 00002

04420	CF	WA9+1,..,		05940	33	05527	00000
04430	BNF	*+60,WA9+1,..,		05952	44	06012	05527
04440	RCTY	...,		05964	34	00000	00102
04450	WATY	ER39CF...,		05976	39	06793	00100
04460	WATY	D20...,		05988	39	02279	00100
04470	H	...,		06000	48	00000	00000
04480*							
04490 R10B	TDM	WA9+3,..,	SET 3 IN WORK AREA EVEN	06012	15	05526	00003
04500	CF	WA9,..,		06024	33	05526	00000
04510	BNF	*+60,WA9,..,		06036	44	06096	05526
04520	RCTY	...,		06048	34	00000	00102
04530	WATY	ER39CF...,		06060	39	06793	00100
04540	WATY	D3E...,		06072	39	03485	00100
04550	H	...,		06084	48	00000	00000
04560*							
04570 R10C	TDM	WA9+1,3,..,	SET 3 IN WORK AREA ODD	06096	15	05527	00003
04580	CF	WA9+1,..,		06108	33	05527	00000
04590	BNF	*+60,WA9+1,..,		06120	44	06180	05527
04600	RCTY	...,		06132	34	00000	00102
04610	WATY	ER39CF...,		06144	39	06793	00100
04620	WATY	D30...,		06156	39	03499	00100
04630	H	...,		06168	48	00000	00000
04640*							
04650 R10D	TDM	WA9+2,11,..,	SET FLAG 2 IN EVEN WORK AREA	06180	15	05526	0000K
04660	CF	WA9,..,		06192	33	05526	00000
04670	BNF	*+60,WA9,..,		06204	44	06264	05526
04680	RCTY	...,		06216	34	00000	00102
04690	WATY	ER39,..,		06228	39	06709	00100
04700	WATY	F2E...,		06240	39	05677	00100
04710	H	...,		06252	48	00000	00000
04720*							
04730 R10E	TDM	WA9+1,2,11,..,	SET FLAG 2 IN ODD WORK AREA	06264	15	05527	0000K
04740	CF	WA9+1,..,		06276	33	05527	00000
04750	BNF	*+60,WA9+1		06288	44	06348	05527
04760	RCTY	...,		06300	34	00000	00102
04770	WATY	ER39,..,		06312	39	06709	00100
04780	WATY	F20...,		06324	39	05799	00100
04790	H	...,		06336	48	00000	00000
04800*							
04810 R10F	TDM	WA9+3,11,..,	SET FLAG 3 IN EVEN WORK AREA	06348	15	05526	0000L
04820	CF	WA9,..,		06360	33	05526	00000
04830	BNF	*+60,WA9,..,		06372	44	06432	05526
04840	RCTY	...,		06384	34	00000	00102
04850	WATY	ER39,..,		06396	39	06709	00100
04860	WATY	F3E...,		06408	39	05821	00100
04870	H	...,		06420	48	00000	00000
04880*							
04890 R10G	TDM	WA9+1,3,11,..,	SET FLAG 3 IN ODD WORK AREA	06432	15	05527	0000L
04900	F	WA9+1,..,		06444	33	05527	00000

04910	BNF	#+60,WA9+1,,	06456	44	06516	05527
04920	RCTY	0,,	06468	34	00000	00102
04930	WATY	ER39,,,	06480	39	06709	00100
04940	WATY	F30,,,	06492	39	05701	00100
04950	H	0,,	06504	48	00000	00000
04960*						
04970 R10H	TDM	WA9+1,,,	SET RECORD MARK IN ODD WORK AREA			
04980	DC	1,,,*	06516	15	05527	00000
04990	CF	WA9+1,,,	06527	00001		
05000	BNF	#+60,WA9+1	06528	33	05527	00000
05010	RCTY	0,,	06540	44	06600	05527
05020	WATY	ER39CF,,,	06552	34	00000	00102
05030	WATY	RMO,,,	06564	39	06793	00100
05040	H	0,,	06576	39	06869	00100
05050*			06588	48	00000	00000
05060 R10I	TDM	WA9,,,	SET RECORD MARK IN EVEN WORK AREA			
05070	DC	1,,,*	06600	15	05526	00000
05080	SF	WA9,,,	06611	00001		
05090	CF	WA9,,,	06612	32	05526	00000
05100	BNF	#+60,WA9,,	06624	33	05526	00000
05110	RCTY	0,,	06636	44	06696	05526
05120	WATY	ER39,,,	06648	34	00000	00102
05130	WATY	FRME,,,	06660	39	06709	00100
05140	H	0,,	06672	39	06901	00100
05150	B	RT012	06684	48	00000	00000
05160*	CONSTANTS USED IN ROUTINE 10					
05170 ER39	DAC	42, CLEAR FLAG (33) DID NOT CLEAR FLAG FROM :	06696	49	06944	00000
05180 ER39CF	DAC	38,CF (33) DID NOT FUNCTION PROPERLY ON :	06709	00084		
05190 RMO	DAC	16,RECORD MARK ODD'	06793	00076		
05200 FRME	DAC	22,FLAG RECORD MARK EVEN'	06869	00032		
05210*			06901	00044		
05220*	ROUTINE 12					
05230*	THIS ROUTINE TESTS TRANSMIT FIELD IMMEDIATE (16)					
05240 RT012	TDM	WA12,7,,	06944	15	08065	00007
05250	TDM	WA12-2,,,	06956	15	08063	00000
05260	TFM	WA12,77712,710,TRANSMIT 2 DIGIT POSITIVE FIELD	06968	16	08065	P77J2
05270	BD	E12A,WA12-2,,, CHECK TRANSMISSION TERMINATION	06980	43	07064	08063
05280	TD	#+23,WA12,,	06992	25	07015	08065
05290	BD	E12B,620,,,	07004	43	07112	00620
05300	TD	#+35,WA12-1,,	07016	25	07051	08064
05310	CF	#+23,,,	07028	33	07051	00000
05320	BD	E12B,610,,,	07040	43	07112	00610
05330	B	R12B,,,	07052	49	07184	00000
05340 E12A	RCTY	0,,	07064	34	00000	00102
05350	WATY	ER41,,,	07076	39	08069	00100
05360	H	0,,	07088	48	00000	00000
05370	B	R12B,,,	07100	49	07184	00000
05380 E12B	RCTY	0,,	07112	34	00000	00102

05390	WATY	ER42,,,	07124	39	08145	00100
05400	WNTY	TFM1-2,,,	07136	38	08462	00100
05410	WATY	WAS,,,	07148	39	08451	00100
05420	WNTY	WA12-1,,,	07160	38	08064	00100
05430	H	,,,	07172	48	00000	00000
05440*						
05450 R12B	TDM	WA12,7,,,	07184	15	08065	00007
05460	TDM	WA12-3,,,	07196	15	08062	00000
05470	TFM	WA12,77124,9, TRANSMIT 3 DIGIT POSITIVE FIELD	07208	16	08065	77J24
05480	BD	E12C,WA12-3,,,	07220	43	07328	08062
05490	TD	*+23,WA12,,,	07232	25	07255	08065
05500	BD	E12D,640,,,	07244	43	07376	00640
05510	TD	*+23,WA12-1,,,	07256	25	07279	08064
05520	BD	E12D,620,,,	07268	43	07376	00620
05530	TD	*+35,WA12-2,,,	07280	25	07315	08063
05540	CF	*+23,,,	07292	33	07315	00000
05550	BD	E12D,610,,,	07304	43	07376	00610
05560	B	R12C,,,	07316	49	07448	00000
05570*						
05580 E12C	RCTY	,,,	07328	34	00000	00102
05590	WATY	ER41,,,	07340	39	08069	00100
05600	H	,,,	07352	48	00000	00000
05610	B	R12C,,,	07364	49	07448	00000
05620 E12D	RCTY	,,,	07376	34	00000	00102
05630	WATY	ER42,,,	07388	39	08145	00100
05640	WNTY	TFM2-3,,,	07400	38	08465	00100
05650	WATY	WAS,,,	07412	39	08451	00100
05660	WNTY	WA12-2,,,	07424	38	08063	00100
05670	H	,,,	07436	48	00000	00000
05680*						
05690 R12C	TDM	WA12,7,,,	07448	15	08065	00007
05700	TFM	WA12,1248,811, TRANSMIT 4 DIGIT NEGATIVE FIELD	07460	16	08065	OJ24Q
05710	BNF	E12E,WA12-3,,, CHECK FIELD DEFINITION	07472	44	07628	08062
05720	BNF	E12F,WA12,,, CHECK SIGN	07484	44	07676	08065
05730	TD	*+35,WA12,,,	07496	25	07531	08065
05740	CF	*+23,,,	07508	33	07531	00000
05750	BD	E12G,680,,,	07520	43	07724	00680
05760	TD	*+23,WA12-1,,,	07532	25	07555	08064
05770	BD	E12G,640,,,	07544	43	07724	00640
05780	TD	*+23,WA12-2,,,	07556	25	07579	08063
05790	BD	E12G,620,,,	07568	43	07724	00620
05800	TD	*+35,WA12-3,,,	07580	25	07615	08062
05810	CF	*+23,,,	07592	33	07615	00000
05820	BD	E12G,610,,,	07604	43	07724	00610
05830	B	R12D,,,	07616	49	07796	00000
05840 E12E	RCTY	,,,	07628	34	00000	00102
05850	WATY	ER43,,,	07640	39	08255	00100
05860	H	,,,	07652	48	00000	00000
05870	B	R12D,,,	07664	49	07796	00000
05880 E12F	RCTY	,,,	07676	34	00000	00102
05890	WATY	ER44,,,	07688	39	08357	00100

05900	H	000	07700	48	00000	00000
05910	B	R12D000	07712	49	07796	00000
05920 E12G	RCTY	000	07724	34	00000	00102
05930	WATY	ER42000	07736	39	08145	00100
05940	WNTY	TFM3-4000	07748	38	08469	00100
05950	WATY	WAS000	07760	39	08451	00100
05960	WNTY	WA12-300	07772	38	08062	00100
05970	H	000	07784	48	00000	00000
05980*						
05990 R12D	TDM	WA12.700	07796	15	08065	00007
06000	TFM	WA12.12480.711, TRANSMIT 5 DIGIT NEGATIVE FIELD	07808	16	08065	J248-
06010	TD	#+35,WA12,00	07820	25	07855	08065
06020	CF	#+23000	07832	33	07855	00000
06030	BD	E12H,607,00	07844	43	07976	00607
06040	TD	#+23,WA12-100	07856	25	07879	08064
06050	BD	E12H,680,00	07868	43	07976	00680
06060	TD	#+23,WA12-200	07880	25	07903	08063
06070	BD	E12H,640,00	07892	43	07976	00640
06080	TD	#+23,WA12-300	07904	25	07927	08062
06090	BD	E12H,620,00	07916	43	07976	00620
06100	TD	#+35,WA12-400	07928	25	07963	08061
06110	CF	#+23,000	07940	33	07963	00000
06120	BD	E12H,610,00	07952	43	07976	00610
06130	B	RT013,000	07964	49	08480	00000
06140 E12H	RCTY	000	07976	34	00000	00102
06150	WATY	ER42000	07988	39	08145	00100
06160	WNTY	TFM4-5000	08000	38	08474	00100
06170	WATY	WAS000	08012	39	08451	00100
06180	WNTY	WA12-4000	08024	38	08061	00100
06190	H	000	08036	48	00000	00000
06200	B	RT013,000	08048	49	08480	00000
06210*		CONSTANTS USED IN ROUTINE 12				
06220 WA12	DC	6,000000	08065	00006		
06230	DC	1,000	08066	00001		
06240 ER41	DAC	38, TFM (16) WAS NOT TERMINATED PROPERLY!	08069	00076		
06250 ER42	DAC	36, TFM (16) DID NOT TRANSMIT PROPERLY.	08145	00072		
06260	DAC	19, SHOULD HAVE BEEN !	08217	00038		
06270 ER43	DAC	41, TFM (16) DID NOT SET FIELD DEFINING FLAG				
			08255	00082		
06280	DAC	10, PROPERLY!	08337	00020		
06290 ER44	DAC	47, TFM (16) DID NOT SET FIELD SIGN FLAG PROPERLY!	08357	00094		
06300 WAS	DAC	6, WAS !	08451	00012		
06310 TFM1	DC	3,12!	08464	00003		
06320 TFM2	DC	4,124!	08468	00004		
06330 TFM3	DC	5,-1248!	08473	00005		
06340 TFM4	DC	6,-12480!	08479	00006		
06350*		ROUTINE 13				
06360*		THIS ROUTINE TESTS TRANSMIT FIELD (26)				
06370 RT013	TDM	WA13.01207,8,	08480	15	08661	OJ207
06380	TF	WA13.*-3*, TRANSMIT 2 DIGIT POSITIVE FIELD	08492	26	08661	08489

06390	TD	*+23,WA13,,	08504	25	08527	08661
06400	BD	E13A,620,,	08516	43	08576	00620
06410	TD	*+35,WA13-1,,	08528	25	08563	08660
06420	CF	*+23,,,	08540	33	08563	00000
06430	BD	E13A,610,,	08552	43	08576	00610
06440	B	RT015,,,	08564	49	08776	00000
06450 E13A	RCTY	,,,	08576	34	00000	00102
06460	WATY	ER45,,,	08588	39	08665	00100
06470	WNTY	TF1-2,,,	08600	38	08772	00100
06480	WATY	WAS,,,	08612	39	08451	00100
06490	WNTY	WA13-1,,	08624	38	08660	00100
06500	H	,,,	08636	48	00000	00000
06510	B	RT015,,,	08648	49	08776	00000
06520*	CONSTANTS USED IN ROUTINE 13					
06530 WA13	DC	2,00	08661	00002		
06540	DC	1,,	08662	00001		
06550 ER45	DAC	47, TF (26) DID NOT TRANSMIT PROPERLY. SHOULD HAVE	08665	00094		
06560	DAC	7, BEEN !	08759	00014		
06570 TF1	DC	3,12*	08774	00003		
06580*	ROUTINE 13					
06590*	THIS ROUTINE CHECKS BRANCH AND TRANSMIT IMMEDIATE (17)					
06600*	AND BRANCH BACK (42)					
06610 RT015	TFM	G015-1,0,10,	08776	16	08871	000-0
06620	TDM	*+25,1,,	MAKE INST. BELOW A NOP (41)			
06630	BTM	G015,12,10,	08788	15	08813	00001
06640	40	*+48,,,	CHANGED TO NOP (41) OR BRANCH (49)			
06650	RCTY	,,,	08812	40	08860	00000
06660	WATY	ER48,,,	08824	34	00000	00102
06670	H	,,,	08836	39	09053	00100
06680	B	CKK5,,,	08848	48	00000	00000
06690 G015	TDM	RT015+37,9,,	MAKE INSTRUCTION ABOVE A BRANCH (49)			
06700	TD	*+23,G015-1,,	08872	15	08813	00009
06710	BD	E15,620,,	08884	25	08907	08871
06720	TD	*+35,G015-2,,	08896	43	09004	00620
06730	CF	*+23,,,	08908	25	08943	08870
06740	BD	E15,610,,	08920	33	08943	00000
06750	BB	*+12,,,	08932	43	09004	00610
06760	RCTY	,,,	08944	42	08956	00000
06770	WATY	ER49,,,	08956	34	00000	00102
06780	H	,,,	08968	39	09107	00100
06790	B	CKK5,,,	08980	48	00000	00000
06800 E15	RCTY	,,,	08992	49	09244	00000
06810	WATY	ER50,,,	09004	34	00000	00102
06820	H	,,,	09016	39	09173	00100
06830	B	CKK5,,,	09028	48	00000	00000
06840*	CONSTANTS USED IN ROUTINE 15					
06850 ER48	DAC	27, BTM (17) FAILED TO BRANCH!	09053	00054		
06860 ER49	DAC	33, BB (42) DID NOT BRANCH PROPERLY!	09107	00066		
06870 ER50	DAC	36, BTM (17) DID NOT TRANSMIT PROPERLY!	09173	00072		

06880\* ROUTINE 18  
 06890\* THIS ROUTINE CHECKS ADD (21)  
 06900 CKK5 TFM CKK1+11,00400 09244 16 09459 -0400  
 06910 TDM CKK1+23,00000 09256 15 09471 00000  
 06920 TDM RZ1+1,1 09268 15 09821 00001  
 06930 TDM RZ2+1,1 09280 15 09881 00001  
 06940 TDM RZ3+1,1 09292 15 09941 00001  
 06950 TDM RZ4+1,1 09304 15 10001 00001  
 06960 TDM RZ5+1,1 09316 15 10061 00001  
 06970 TDM RZ6+1,1 09328 15 10121 00001  
 06980 TDM RZ7+1,1 09340 15 10181 00001  
 06990 TDM RZ8+1,1 09352 15 10241 00001  
 07000 TDM RZ9+1,1 09364 15 10301 00001  
 07010 TFM \*+18,SUM 09376 16 09394 -0800  
 07020\*  
 07030 CKK TR 00800,B-19 09388 31 00800 00511  
 07040 A SUM+19,A 09400 21 00819 00509  
 07050 CF SUM+10 09412 33 00810 00000  
 07060 BNF \*+24,SUM+10 09424 44 09448 00810  
 07070 B ERROR 09436 49 10696 00000  
 07080\*  
 07090 CKK1 TFM \*+47,00400 09448 16 09495 -0400  
 07100 TDM \*+34,00000 09460 15 09494 00000  
 07110\*  
 07120 TD \*+23,SUM+10 09472 25 09495 00810  
 07130 BD ERROR,00400 09484 43 10696 00400  
 07140 TF \*+35,\*-1 09496 26 09531 09495  
 07150\*  
 07160 TD \*+23,SUM+11 09508 25 09531 00811  
 07170 BD ERROR,00400 09520 43 10696 00400  
 07180 TF \*+35,\*-1 09532 26 09567 09531  
 07190\*  
 07200 TD \*+23,SUM+12 09544 25 09567 00812  
 07210 BD ERROR,00400 09556 43 10696 00400  
 07220 TF \*+35,\*-1 09568 26 09603 09567  
 07230\*  
 07240 TD \*+23,SUM+13 09580 25 09603 00813  
 07250 BD ERROR,00400 09592 43 10696 00400  
 07260 TF \*+35,\*-1 09604 26 09639 09603  
 07270\*  
 07280 TD \*+23,SUM+14 09616 25 09639 00814  
 07290 BD ERROR,00400 09628 43 10696 00400  
 07300 TF \*+35,\*-1 09640 26 09675 09639  
 07310\*  
 07320 TD \*+23,SUM+15 09652 25 09675 00815  
 07330 BD ERROR,00400 09664 43 10696 00400  
 07340 TF \*+35,\*-1 09676 26 09711 09675  
 07350\*  
 07360 TD \*+23,SUM+16 09688 25 09711 00816  
 07370 BD ERROR,00400 09700 43 10696 00400  
 07380 TF \*+35,\*-1 09712 26 09747 09711  
 07390\*  
 07400 TD \*+23,SUM+17 09724 25 09747 00817

07410	BD	ERROR,00400	09736	43	10696	00400
07420	TF	*+35,*-1	09748	26	09783	09747
07430*						
07440	TD	*+23,SUM+18	09760	25	09783	00818
07450	BD	ERROR,00400	09772	43	10696	00400
07460	TF	*+35,*-1	09784	26	09819	09783
07470*						
07480	TD	*+23,SUM+19	09796	25	09819	00819
07490	BD	ERROR,00400	09808	43	10696	00400
07500*						
07510 RZ1	NOP	*+60	09820	41	09880	00000
07520	TDM	CKK+6,00001	09832	15	09394	00001
07530	TDM	CKK1+23,00001	09844	15	09471	00001
07540	TDM	*-35,00009	09856	15	09821	00009
07550	B	CKK	09868	49	09388	00000
07560*						
07570 RZ2	NOP	*+60	09880	41	09940	00000
07580	TDM	CKK+6,00002	09892	15	09394	00002
07590	TDM	CKK1+23,00002	09904	15	09471	00002
07600	TDM	*-35,00009	09916	15	09881	00009
07610	B	CKK	09928	49	09388	00000
07620*						
07630 RZ3	NOP	*+60	09940	41	10000	00000
07640	TDM	CKK+6,00003	09952	15	09394	00003
07650	TDM	CKK1+23,00003	09964	15	09471	00003
07660	TDM	*-35,00009	09976	15	09941	00009
07670	B	CKK	09988	49	09388	00000
07680*						
07690 RZ4	NOP	*+60	10000	41	10060	00000
07700	TDM	CKK+6,00004	10012	15	09394	00004
07710	TDM	CKK1+23,00004	10024	15	09471	00004
07720	TDM	*-35,00009	10036	15	10001	00009
07730	B	CKK	10048	49	09388	00000
07740*						
07750 RZ5	NOP	*+60	10060	41	10120	00000
07760	TDM	CKK+6,00005	10072	15	09394	00005
07770	TDM	CKK1+23,00005	10084	15	09471	00005
07780	TDM	*-35,00009	10096	15	10061	00009
07790	B	CKK	10108	49	09388	00000
07800*						
07810 RZ6	NOP	*+60	10120	41	10180	00000
07820	TDM	CKK+6,00006	10132	15	09394	00006
07830	TDM	CKK1+23,00006	10144	15	09471	00006
07840	TDM	*-35,00009	10156	15	10121	00009
07850	B	CKK	10168	49	09388	00000
07860*						
07870 RZ7	NOP	*+60	10180	41	10240	00000
07880	TDM	CKK+6,00007	10192	15	09394	00007
07890	TDM	CKK1+23,00007	10204	15	09471	00007
07900	TDM	*-35,00009	10216	15	10181	00009
07910	B	CKK	10228	49	09388	00000
07920*						
07930 RZ8	NOP	*+60	10240	41	10300	00000

07940	TDM	CKK+6,00008	10252	15	09394	00008
07950	TDM	CKK1+23,00008	10264	15	09471	00008
07960	TDM	*-35,00009	10276	15	10241	00009
07970	B	CKK	10288	49	09388	00000
07980*						
07990 RZ9	NOP	*+60	10300	41	10360	00000
08000	TDM	CKK+6,00009	10312	15	09394	00009
08010	TDM	CKK1+23,00009	10324	15	09471	00009
08020	TDM	*-35,00009	10336	15	10301	00009
08030	B	CKK	10348	49	09388	00000
08040*						
08050*						
08060	NOP	*+36	10360	41	10396	00000
08070	TDM	*-11,00009	10372	15	10361	00009
08080	B	CKK5	10384	49	09244	00000
08090*						
08100	NOP	*+36	10396	41	10432	00000
08110	TDM	*-11,00009	10408	15	10397	00009
08120	B	CKK5	10420	49	09244	00000
08130*						
08140	NOP	*+36	10432	41	10468	00000
08150	TDM	*-11,00009	10444	15	10433	00009
08160	B	CKK5	10456	49	09244	00000
08170*						
08180	NOP	*+36	10468	41	10504	00000
08190	TDM	*-11,00009	10480	15	10469	00009
08200	B	CKK5	10492	49	09244	00000
08210*						
08220	NOP	*+36	10504	41	10540	00000
08230	TDM	*-11,00009	10516	15	10505	00009
08240	B	CKK5	10528	49	09244	00000
08250*						
08260	NOP	*+36	10540	41	10576	00000
08270	TDM	*-11,00009	10552	15	10541	00009
08280	B	CKK5	10564	49	09244	00000
08290*						
08300	NOP	*+36	10576	41	10612	00000
08310	TDM	*-11,00009	10588	15	10577	00009
08320	B	CKK5	10600	49	09244	00000
08330*						
08340	NOP	*+36	10612	41	10648	00000
08350	TDM	*-11,00009	10624	15	10613	00009
08360	B	CKK5	10636	49	09244	00000
08370*						
08380	NOP	*+36	10648	41	10684	00000
08390	TDM	*-11,00009	10660	15	10649	00009
08400	B	CKK5	10672	49	09244	00000
08410*						
08420	B	RT019	10684	49	10760	00000
08430*						
08440 ERROR	RCTY		10696	34	00000	00102
08450	WATY ERZ1		10708	39	10733	00100
08460	B	RT019	10720	49	10760	00000

08470*				10733 00028
08480 ERZ1	DAC	14,ARITH TROUBLE!		
08490*		ROUTINE 19		
08500*	THIS ROUTINE CHECKS ADD IMMEDIATE (11) AND THE ARITHMETIC INDICATORS 11,12 AND 13			
08520 RT019	TFM	SUMC,3,10,		10760 16 12033 000-3
	AM	SUMC,1,10,, ADD 03 AND 01		10772 11 12033 000-1
	TD	*+23,SUMC,,		10784 25 10807 12033
	BD	*+24,640,,		10796 43 10820 00640
	B	*+24,,,		10808 49 10832 00000
	BTM	E19,3001,,		10820 17 11732 -3001
	BH	*+24,,,		10832 46 10856 01100
	BTM	E19N,3111,,		10844 17 11780 -3111
	BNE	*+24,,,		10856 47 10880 01200
	BTM	E19F,3121,,		10868 17 11852 -3121
	BNL	*+24,,,		10880 46 10904 01300
	BTM	E19N,3131,,		10892 17 11780 -3131
08640 R19A	TFM	SUMC,2,10,		10904 16 12033 000-2
	AM	SUMC,3,10,, ADD 02 AND 03		10916 11 12033 000-3
	TD	*+23,SUMC,,		10928 25 10951 12033
	BD	*+24,650,,		10940 43 10964 00650
	B	*+24,,,		10952 49 10976 00000
	BTM	E19,2003,,		10964 17 11732 -2003
	BH	*+24,,,		10976 46 11000 01100
	BTM	E19N,2113,,		10988 17 11780 -2113
	BNE	*+24,,,		11000 47 11024 01200
	BTM	E19F,2123,,		11012 17 11852 -2123
08740 R19B	TFM	SUMC,4,10,		11024 16 12033 000-4
	AM	SUMC,2,10,, ADD 04 AND 02		11036 11 12033 000-2
	BNE	*+24,,,		11048 47 11072 01200
	BTM	E19F,4122,,		(CHECK AND CIRCUIT
08780 R19C	TFM	SUMC,2,1011,,		11060 17 11852 -4122
	AM	SUMC,1,10,, ADD -02 AND 01		11072 16 12033 000-K
	BNH	*+24,,,		11084 11 12033 000-1
	BTM	E19F,2111,8,,		11096 47 11120 01100
	BL	*+24,,,		11108 17 11852 OK111
	BTM	E19F,2131,8,,		11120 47 11144 01300
08840 R19D	TFM	SUMC,1,1011,,		11132 17 11852 OK131
	AM	SUMC,2,10,, ADD -01 AND 02		11144 16 12033 000-J
	BH	*+24,,,		11156 11 12033 000-2
	BTM	E19N,1112,8,,		11168 46 11192 01100
08880 R19E	TFM	SUMC,2,10,,		11180 17 11780 OJ112
	AM	SUMC,1,1011,, ADD 02 AND -01		11192 16 12033 000-2
	BH	*+24,,,		11204 11 12033 000-J
	BTM	E19N,2111,711,,		11216 46 11240 01100
08920 R19F	TFM	SUMC,1,10,,		11228 17 11780 -211J
	AM	SUMC,2,1011,, ADD 01 AND -02		11240 16 12033 000-1
	BNH	*+24,,,		11252 11 12033 000-K
	BTM	E19F,1112,711,,		11264 47 11288 01100
	BL	*+24,,,		11276 17 11852 -111K
	BTM	E19F,1132,711,,		11288 47 11312 01300
08980 R19G	TFM	SUMC,2,1011,, ADD -02 AND -01		11300 17 11852 -113K
				11312 16 12033 000-K

08990	AM	SUMC,1,1011,	11324	11	12033	000-J
09000	BNH	*+24,,,	11336	47	11360	01100
09010	BTM	E19F,2111,811,	11348	17	11852	OK11J
09020 R19H	TFM	SUMC,1,1011,	11360	16	12033	000-J
09030	AM	SUMC,2,1011, ADD -01 AND -02	11372	11	12033	000-K
09040	BNH	*+24,,,	11384	47	11408	01100
09050	BTM	E19F,1112,811	11396	17	11852	OJ11K
09060 R19I	TFM	SUMC,,1011,	11408	16	12033	000--
09070	AM	SUMC,,10, ADD -00 AND 00	11420	11	12033	000-0
09080	BNH	*+24,,,	11432	47	11456	01100
09090	BTM	E19F,0110,8,	11444	17	11852	O-110
09100	BE	*+24,,,	11456	46	11480	01200
09110	BTM	E19N,0120,8,	11468	17	11780	O-120
09120	BNL	*+24,,,	11480	46	11504	01300
09130	BTM	E19N,0130,8,	11492	17	11780	O-130
09140 R19J	TFM	SUMC,,10,	11504	16	12033	000-0
09150	AM	SUMC,,10, ADD 00 AND 00	11516	11	12033	000-0
09160	BNH	*+24,,,	11528	47	11552	01100
09170	BTM	E19F,0110,,	11540	17	11852	-0110
09180	BE	*+24,,,	11552	46	11576	01200
09190	BTM	E19N,0120,,	11564	17	11780	-0120
09200 R19K	TFM	SUMC,2,1011,	11576	16	12033	000-K
09210	AM	SUMC,2,10, ADD -02 AND 02	11588	11	12033	000-2
09220	ENH	*+24,,,	11600	47	11624	01100
09230	BTM	E19F,2112,8,	11612	17	11852	OK112
09240	BE	*+24,,,	11624	46	11648	01200
09250	BTM	E19N,2122,8,	11636	17	11780	OK122
09260 R19L	TFM	SUMC,1,10,	11648	16	12033	000-1
09270	AM	SUMC,1,1011, ADD 01 AND -01	11660	11	12033	000-J
09280	BNH	*+24,,,	11672	47	11696	01100
09290	BTM	E19F,1111,711,	11684	17	11852	-111J
09300	BE	*+24,,,	11696	46	11720	01200
09310	BTM	E19N,1121,711,	11708	17	11780	-112J
09320	B	RT020,,,	11720	49	12298	00000
09330 E19	RCTY	,,,	11732	34	00000	00102
09340	WATY	ER55,,,	11744	39	12257	00100
09350	TF	DT19,E19-1	11756	26	12039	11731
09360	B	DOE19,,,	11768	49	11912	00000
09370 E19N	RCTY	,,,	11780	34	00000	00102
09380	TF	DT19,E19N-1,,	11792	26	12039	11779
09390	WATY	ER58,,,	11804	39	12175	00100
09400	TF	ET19-1,E19N-2,,	11816	26	12048	11778
09410	WNTY	ET19-2,,,	11828	38	12047	00100
09420	B	DOE19	11840	49	11912	00000
09430 E19F	RCTY	,,,	11852	34	00000	00102
09440	TF	DT19,E19F-1	11864	26	12039	11851
09450	WATY	ER57	11876	39	12093	00100
09460	TF	ET19-1,E19F-2,,	11888	26	12048	11850
09470	WNTY	ET19-2,,,	11900	38	12047	00100
09480 DOE19	RCTY	,,,	11912	34	00000	00102
09490	TD	ETA1-1,DT19,,	11924	25	12041	12039
09500	TD	ETA2-1,DT19-3,,	11936	25	12044	12036
09510	WATY	ER56,,,	11948	39	12051	00100

09520		WNTY	ETA2-2,,	11960	38	12043	00100
09530		WATY	PLS,,,	11972	39	12283	00100
09540		WNTY	ETA1-2,,,	11984	38	12040	00100
09550		WATY	EQ,,,	11996	39	12291	00100
09560		WNTY	SUMC-1,,,	12008	38	12032	00100
09570		BB	,,,	12020	A2	00000	00000
09580*		CONSTANTS FOR ROUTINE 19					
09590	SUMC	DC	2,00	12033	00002		
09600		DC	1,	12034	00001		
09610	DT19	DC	5,00000	12039	00005		
09620	ETA1	DC	3,00,	12042	00003		
09630	ETA2	DC	3,00,	12045	00003		
09640	ET19	DC	4,000,	12049	00004		
09650	ER56	DAC	21, ADD IMMEDIATE (11) ,	12051	00042		
09660	ER57	DAC	41, INDICATOR ON, SHOULD BE OFF, INDICATOR ,	12093	00082		
09670	ER58	DAC	41, INDICATOR OFF, SHOULD BE ON, INDICATOR ,	12175	00082		
09680	ER55	DAC	13, ADD ERROR, ,	12257	00026		
09690	PLS	DAC	04, + ,	12283	00008		
09700	EQ	DAC	04, = ,	12291	00008		
09710*		ROUTINE 20					
09720*		THIS ROUTINE TESTS COMPARE IMMEDIATE (14)					
09730	RT020	TFM	WA20,15,10,	12298	16	12827	000J5
09740		CM	WA20,15,10,	12310	14	12827	000J5
09750		TD	#+23,WA20,,	12322	25	12345	12827
09760		BD	E20,650,,,	12334	43	12514	00650
09770		TD	#+35,WA20-1,,	12346	25	12381	12826
09780		CF	#+23,,,	12358	33	12381	00000
09790		BD	E20,610,,,	12370	43	12514	00610
09800		BE	#+60,,,	12382	46	12442	01200
09810		RCTY	,,,	12394	34	00000	00102
09820		WATY	ER59,,,	12406	39	12829	00100
09830		WATY	ER60,,,	12418	39	12859	00100
09840		H	,,,	12430	48	00000	00000
09850		BNH	#+60,,,	12442	47	12502	01100
09860		RCTY	,,,	12454	34	00000	00102
09870		WATY	ER59,,,	12466	39	12829	00100
09880		WATY	ER61,,,	12478	39	12909	00100
09890		H	,,,	12490	48	00000	00000
09900		B	R20A,,,	12502	49	12550	00000
09910	E20	RCTY	,,,	12514	34	00000	00102
09920		WATY	ER62,,,	12526	39	12967	00100
09930		H	,,,	12538	48	00000	00000
09940*							
09950	R20A	TFM	WA20,15,10,	12550	16	12827	000J5
09960		CM	WA20,15,1011,	12562	14	12827	000JN
09970		BE	E20A,,,	12574	46	12610	01200
09980		BNH	E20B,,,	12586	47	12670	01100
09990		B	R20B,,,	12598	49	12718	00000
10000	E20A	RCTY	,,,	12610	34	00000	00102
10010		WATY	ER59,,,	12622	39	12829	00100
10020		WATY	ER63,,,	12634	39	13017	00100

10030	H	***		12646	48	00000	00000
10040	B	R20B***		12658	49	12718	00000
10050 E208	RCTY			12670	34	00000	00102
10060	WATY	ER59***		12682	39	12829	00100
10070	WATY	ER64***		12694	39	13069	00100
10080	H	***		12706	48	00000	00000
10090*							
10100 R208	TFM	WA20,15,1011,		12718	16	12827	000JN
10110	CM	WA20,15,10,		12730	14	12827	000J5
10120	BNL	*+24***		12742	46	12766	01300
10130	B	RT021		12754	49	13176	00000
10140	RCTY	***		12766	34	00000	00102
10150	WATY	ER59***		12778	39	12829	00100
10160	WATY	ER65***		12790	39	13125	00100
10170	H	***		12802	48	00000	00000
10180	B	RT021***		12814	49	13176	00000
10190*		CONSTANTS USED IN ROUTINE 20					
10200 WA20	DC	02,00		12827	00002		
10210 ER59	DAC	15, CM (14) ERROR!		12829	00030		
10220 ER60	DAC	25, EQUAL ZERO SHOULD BE ON!		12859	00050		
10230 ER61	DAC	29, HIGH POSITIVE SHOULD BE OFF!		12909	00058		
10240 ER62	DAC	25, CM (14) ALTERED P FIELD!		12957	00050		
10250 ER63	DAC	26, EQUAL ZERO SHOULD BE OFF!		13017	00052		
10260 ER64	DAC	28, HIGH POSITIVE SHOULD BE ON!		13069	00056		
10270 ER65	DAC	26, HIGH/EQUAL SHOULD BE OFF!		13125	00052		
10280*		ROUTINE 21					
10290*		THIS ROUTINE TESTS COMPARE					
10300 RT021	TF	WA21,D21***		13176	26	13423	13410
10310	C	WA21,D21A***		13188	24	13423	13414
10320	TD	*+23,WA21-1***		13200	25	13223	13422
10330	BD	E21A,640***		13212	43	13260	00640
10340	BE	E21B***		13224	46	13308	01200
10350	BNH	E21C***		13236	47	13356	01100
10360	B	RT024X***		13248	49	13602	00000
10370 E21A	RCTY	***		13260	34	00000	00102
10380	WATY	ER66***		13272	39	13425	00100
10390	H	***		13284	48	00000	00000
10400	B	RT024X***		13296	49	13602	00000
10410 E21B	RCTY	***		13308	34	00000	00102
10420	WATY	ER67***		13320	39	13473	00100
10430	H	***		13332	48	00000	00000
10440	B	RT024X***		13344	49	13602	00000
10450 E21C	RCTY	***		13356	34	00000	00102
10460	WATY	ER68***		13368	39	13539	00100
10470	H	***		13380	48	00000	00000
10480	B	RT024X***		13392	49	13602	00000
10490*		CONSTANTS USED IN ROUTINE 21					
10500 D21	DC	7,1001248		13410	00007		
10510 D21A	DC	4,1248		13414	00004		
10520 WA21	DC	9,0		13423	00009		
10530 ER66	DAC	24, C (24) ALTERED P FIELD!		13425	00048		
10540 ER67	DAC	33, C (24) ERROR, E/Z SHOULD BE OFF!		13473	00066		
10550 ER68	DAC	32, C (24) ERROR, H/P SHOULD BE ON!		13539	00064		

10560\* ROUTINE 24

10570 RT024X TFM AAA,98765  
 10580 SM AAA,22222  
 10590 CM AAA,76543  
 10600 BE \*\*+48  
 10610 RCTY  
 10620 WATY RTX1  
 10630 H  
 10640 TFM AAA,56789  
 10650 SM AAA,22222  
 10660 CM AAA,34567  
 10670 BE \*\*+48  
 10680 RCTY  
 10690 WATY RTX1  
 10700 H  
 10710 TFM AAA,43210  
 10720 SM AAA,22222  
 10730 CM AAA,20988  
 10740 BE \*\*+48  
 10750 RCTY  
 10760 WATY RTX1  
 10770 H  
 10780 TFM AAA,12345  
 10790 SM AAA,11111  
 10800 CM AAA,01234  
 10810 BE \*\*+48  
 10820 RCTY  
 10830 WATY RTX1  
 10840 H  
 10850 TFM AAA,56789  
 10860 SM AAA,11111  
 10870 CM AAA,45678  
 10880 BE \*\*+48  
 10890 RCTY  
 10900 WATY RTX1  
 10910 H  
 10920 B RT024  
 10930 RTX1 DAC 16,SUBTRACT FAILED!  
 10940 AAA DC 5,00000  
 10950\* THIS ROUTINE TESTS TRANSMIT RECORD (31)  
 10960 RT024 TFM WA24,,,  
 10970 TR WA24-3,D24A,, TRANSMIT 2 DIGITS ODD  
 10980 BNR ER24,WA24-1,,  
 10990 BD ER24A,WA24,,  
 11000 CM WA24-2,35,9,  
 11010 BE R24A,,,  
 11020 RCTY ,,,  
 11030 WATY ER74,,,  
 11040 WNTY WA24-3,,,  
 11050 WATY 5B,,,  
 11060 WNTY D24A,,,  
 11070 H ,,,  
 11080 B R24A,,,

13602 16 14070 R8765  
 13614 12 14070 K2222  
 13626 14 14070 P6543  
 13638 46 13686 01200  
 13650 34 00000 00102  
 13662 39 14035 00100  
 13674 48 00000 00000  
 13686 16 14070 N6789  
 13698 12 14070 K2222  
 13710 14 14070 L4567  
 13722 46 13770 01200  
 13734 34 00000 00102  
 13746 39 14035 00100  
 13758 48 00000 00000  
 13770 16 14070 M3210  
 13782 12 14070 K2222  
 13794 14 14070 K0988  
 13806 46 13854 01200  
 13818 34 00000 00102  
 13830 39 14035 00100  
 13842 48 00000 00000  
 13854 16 14070 J2345  
 13866 12 14070 J1111  
 13878 14 14070 -1234  
 13890 46 13938 01200  
 13902 34 00000 00102  
 13914 39 14035 00100  
 13926 48 00000 00000  
 13938 16 14070 N6789  
 13950 12 14070 J1111  
 13962 14 14070 M5678  
 13974 46 14022 01200  
 13986 34 00000 00102  
 13998 39 14035 00100  
 14010 48 00000 00000  
 14022 49 14072 00000  
 14035 00032  
 14070 00005

14072 16 15360 -0000  
 14084 31 15357 15363  
 14096 45 14228 15359  
 14108 43 14276 15360  
 14120 14 15358 00-35  
 14132 46 14312 01200  
 14144 34 00000 00102  
 14156 39 15381 00100  
 14168 38 15357 00100  
 14180 39 15463 00100  
 14192 38 15363 00100  
 14204 48 00000 00000  
 14216 49 14312 00000

11090	ER24	RCTY	,,,		14228	34	00000	00102
11100		WATY	ER75,,,		14240	39	15501	00100
11110		H	,,,		14252	48	00000	00000
11120		B	R24A,,,		14264	49	14312	00000
11130	ER24A	RCTY	,,,		14276	34	00000	00102
11140		WATY	ER76		14288	39	15567	00100
11150		H	,,,		14300	48	00000	00000
11160*								
11170	R24A	TFM	WA24,,,		14312	16	15360	-0000
11180		TR	WA24-2,D24B,,,	TRANSMIT 2 DIGITS EVEN	14324	31	15358	15368
11190		BNR	ER24B,WA24,,,		14336	45	14468	15360
11200		BD	ER24C,WA24+1,,,		14348	43	14516	15361
11210		CM	WA24-1,14,8,,		14360	14	15359	0-014
11220		BE	R24B,,,		14372	46	14552	01200
11230		RCTY	,,,		14384	34	00000	00102
11240		WATY	ER74,,,		14396	39	15381	00100
11250		WNTY	WA24-2,,,		14408	38	15358	00100
11260		WATY	SB,,,		14420	39	15463	00100
11270		WNTY	D24B,,,		14432	38	15368	00100
11280		H	,,,		14444	48	00000	00000
11290		B	R24B,,,		14456	49	14552	00000
11300	ER24B	RCTY	,,,		14468	34	00000	00102
11310		WATY	ER75,,,		14480	39	15501	00100
11320		H	,,,		14492	48	00000	00000
11330		B	R24B,,,		14504	49	14552	00000
11340	ER24C	RCTY	,,,		14516	34	00000	00102
11350		WATY	ER76,,,		14528	39	15567	00100
11360		H	,,,		14540	48	00000	00000
11370*								
11380	R24B	TFM	WA24,,,		14552	16	15360	-0000
11390		TR	WA24-4,D24C,,,		14564	31	15356	15372
11400		BNR	ER24D,WA24-1,,,		14576	45	14696	15359
11410		CM	WA24-2,579,9,,		14588	14	15358	00N79
11420		BE	R24C,,,		14600	46	14732	01200
11430		RCTY	,,,		14612	34	00000	00102
11440		WATY	ER74,,,		14624	39	15381	00100
11450		WNTY	WA24-4,,,		14636	38	15356	00100
11460		WATY	SB,,,		14648	39	15463	00100
11470		WNTY	D24C,,,		14660	38	15372	00100
11480		H	,,,		14672	48	00000	00000
11490		B	R24C,,,		14684	49	14732	00000
11500	ER24D	RCTY	,,,		14696	34	00000	00102
11510		WATY	ER75,,,		14708	39	15501	00100
11520		H	,,,		14720	48	00000	00000
11530*								
11540	R24C	TFM	WA24,,,		14732	16	15360	-0000
11550		TR	WA24-2,D24D,,,		14744	31	15358	15376
11560		BNR	ER24E,WA24-1,,,		14756	45	14876	15359
11570		CM	WA24-2,8,9,,		14768	14	15358	00-08
11580		BE	R24D,,,		14780	46	14912	01200
11590		RCTY	,,,		14792	34	00000	00102
11600		WATY	ER74,,,		14804	39	15381	00100
11610		WNTY	WA24-2,,,		14816	38	15358	00100

11620		WATY	SB***	14828	39	15463	00100
11630		WNTY	D24D	14840	38	15376	00100
11640		H	***	14852	48	00000	00000
11650		B	R24D***	14864	49	14912	00000
11660	ER24E	RCTY	***	14876	34	00000	00102
11670		WATY	ER75***	14888	39	15501	00100
11680		H	***	14900	48	00000	00000
11690*							
11700	R24D	SF	D24E***	14912	32	15378	00000
11710		SF	D24E+1***	14924	32	15379	00000
11720		TFM	WA24***	14936	16	15360	-0000
11730		TR	WA24-1,D24E***	14948	31	15359	15378
11740		BNR	ER24F,WA24-1***	14960	45	15008	15359
11750		BD	ER24G,WA24***	14972	43	15056	15360
11760		BNF	ER24H,WA24-1***	14984	44	15104	15359
11770		B	R24E***	14996	49	15140	00000
11780	ER24F	RCTY	***	15008	34	00000	00102
11790		WATY	ER75***	15020	39	15501	00100
11800		H	***	15032	48	00000	00000
11810		B	R24E***	15044	49	15140	00000
11820	ER24G	RCTY	***	15056	34	00000	00102
11830		WATY	ER76***	15068	39	15567	00100
11840		H	***	15080	48	00000	00000
11850		B	R24E***	15092	49	15140	00000
11860	ER24H	RCTY	***	15104	34	00000	00102
11870		WATY	ER77***	15116	39	15639	00100
11880		H	***	15128	48	00000	00000
11890*							
11900	R24E	TFM	WA24***	15140	16	15360	-0000
11910		TR	WA24-2,D24E+1***	15152	31	15358	15379
11920		BNR	ER24I,WA24-2***	15164	45	15212	15358
11930		BD	ER24J,WA24-1***	15176	43	15260	15359
11940		BNF	ER24K,WA24-2***	15188	44	15308	15358
11950		B	END***	15200	49	15702	00000
11960	ER24I	RCTY	***	15212	34	00000	00102
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12020		H	***	15284	48	00000	00000
12030		B	END***	15296	49	15702	00000
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12050		WATY	ER77***	15320	39	15639	00100
12060		H	***	15332	48	00000	00000
12070		B	END***	15344	49	15702	00000
12080*			CONSTANTS USED IN ROUTINE 24				
12090	WA24	DC	5.0	15360		00005	
12100		DC	2.0	15362		00002	
12110	D24A	DSC	3.35*	15363		00003	
12120		DC	1.1	15366		00001	
12130		DC	1.0	15367		00001	
12140	D24B	DSC	3.14*	15368		00003	

12150	DC	1,*	15371	00001
12160	D24C	DC 1,5	15372	00001
12170	DSC	3,79*	15373	00003
12180	D24D	DSC 2,8*	15376	00002
12190	D24E	DSC 1,*	15378	00001
12200	DSC	1,*	15379	00001
12210	ER74	DAC 41, TR (31) DID NOT TRANSMIT PROPERLY, WAS *	15381	00082
12220	SB	DAC 19, SHOULD HAVE BEEN *	15463	00038
12230	ER75	DAC 33, TR (31) DID NOT SET RECORD MARK*	15501	00066
12240	ER76	DAC 36, TR (31) DID NOT TERMINATE PROPERLY*	15567	00072
12250	ER77	DAC 32, FLAG ON -RM NOT SET ON TR (31)*	15639	00064
12260	*	END ROUTINE		
12270	END	AM COUNT,1,10,	15702	11 15880 000-1
12280		CM COUNT,100,9,	15714	14 15880 00J00
12290		BE *+24,*,	15726	46 15750 01200
12300		B RT01,,,	15738	49 01000 00000
12310		TFM COUNT,,9,	15750	16 15880 00-00
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12330		RN DC1,00702	15774	36 15980 00702
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12350		BTM ERT0,00260	15798	17 15822 -0260
12360		DC 01,*,*	15809	00001
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12390		WATY ERT	15834	39 15871 00100
12400		WNTY ERT0-3	15846	38 15819 00100
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12420	ERT	DAC 04,ER *	15871	00008
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12460		TDM DC1-1,0	15894	15 15979 00000
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12500		A DC1-1,DC1-1	15942	21 15979 15979
12510		AM DC1-1,01,10	15954	11 15979 000-1
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12530		TFM DC1A,WRITE+100	15978	16 16279 K0000
12540		SM DC1A,X	15990	12 16279 J8000
12550		TF DC1+8,DC1A-2	16002	26 15988 16277
12560		TD HDC1,DC1-1	16014	25 16230 15979
12570		TFM DC1A,LALAB	16026	16 16279 J6228
12580		TF HDC1+8,DC1A-2	16038	26 16238 16277
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12790	I02	DAC 17,MONITOR LOAD WILL	16303	00034		
12800		DAC 19, BE PUNCHED ON 1622	16337	00038		
12810		DAC 12, CARD PUNCH!	16375	00024		
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12840	DC1	DSC 09,900806999	15980	00009		
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12870	LODIT8	DAC 15,SW3 ON IF PRO .I	15997	00030		
12880		DAC 16,S ON PAPER TAPE!	16027	00032		
12890	PROG	DAC 15,SW2 OFF IF PROG	16059	00030		
12900		DAC 18,RAM IS COMPATIBLE!	16089	00036		
12910	SW1	DAC 16,SW1 ON TO REPLAC	16125	00032		
12920		DAC 10,E PROGRAM!	16157	00020		
12930	IO	DAC 11,OUTPUT IS !	16177	00022		
12940	MODE	DAC 6,MODE !	16199	00012		
12950	IM	DAC 09,INPUT IS!	16211	00018		
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12980	WRITE	DS ,19900	19900	00000		
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## 6.0 RELEASED DIPAL COMPATIBLE TESTS

Diagnostic Name	DIPAL Name	Using System	1620-I	1620-II	1710-I	1710-II	Tested	Features
CU 02	CU 02	X		X			X	Validity
DT 0010	DT 10			X			X	RTC/MES
DT 0011	DT 11			X			X	ADC
DT 0012	DT 12			X				TAS
DT 0013	DT 13			X				CO/PBI/A0
DT 0014	DT 14			X			X	Interrupt
DT 0015	DT 15			X				Seek Complete
DT 0017	DT 17			X				MEU/DDU/SSU
DT 0018	DT 18			X				Output Printer
DT 0019	DT 19			X			X	HSCS
DT 0021	DT 21	X	X	X			X	1311
DT 0022	DT 22	X	X	X			X	1311
DT 0041	DT 41			X			X	PC/PD/LC0/DI/ RTC/CM
DT 0042	DT 42			X			X	HSADC
DT 0043	DT 43	X	X	X			X	1443 Printer
DT 0101	0101			X			X	) Central
DT 0102	0102			X			X	) Processing
DT 0103	0103			X			X	) Unit
DT 0104	0104			X			X	Validity
DT 0105	0105			X			X	Index Registers
DT 0106	0106	X	X	X			X	Floating Point
DT 0107	0107			X			X	Binary Capabilities
DT 0108	0108			X			X	Binary I/O
DT 0109	0109			X			X	Typewriter
DT 0110	0110			X			X	Paper Tape
DT 0112	D112						X	TAS
DT 0113	D113						X	CO/PBI/A0
DT 0115	D115						X	SEEK Complete
DT 0117	D117						X	MEU/DDU/SSU
DT 0118	D118						X	Output Printer
DTX 01	DX01	X			X			CPU Header
DTX 02	DX02	X		X				CPU Header
DTX 03	DX03	X			X			Typewriter
DTX 04	DX04	X			X			Special Instructions
DTX 06	DX06	X			X			Indirect Addressing